

**Maine East-West Highway:
Economic Impact Analysis**

**Phase I Technical Report
Baseline Conditions**

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Prepared for **Maine State Planning Office
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I Introduction

Overview

The purpose of this report is to present and summarize the findings of baseline data collected as part of the economic impact analysis of the proposed Maine East-West Highway. The objectives of this first phase of study were to:

- a. Review the findings of prior studies of US and Canadian travel patterns and trade flows;
- b. Evaluate the physical characteristics and traffic volumes carried by existing transportation infrastructure which is located within and beyond Maine's borders;
- c. Summarize recent and projected economic and market conditions in the major US and Canadian metropolitan areas which are likely to generate traffic demand for the proposed highway;
- d. Document the volumes, characteristics, origin and destination of commodity flows which are currently passing through or around Maine, by mode of shipment;
- e. Draft survey instruments and develop survey sampling strategies for the next phase of study; and
- f. Recommend conceptual corridors for application of the economic impact analysis.

A prerequisite objective of Phase I was to recommend a limited number of conceptual highway corridors on which to focus the survey research, baseline data collection and the impact evaluation phase of the analysis. The selection of these corridors took place after an initial round of interviews, data analysis and presentations of preliminary findings to MSPO and MDOT staff. Comments from representatives of other interested agencies and interest groups were also solicited during this process.

Factors considered in proposing conceptual corridors for an east-west highway through Maine were limited to the following general economic and market issues:

- a. The characteristics of the existing economic base within those regions of the State which could be served by potential east-west highway corridor(s);
- b. The economic characteristics of the major Canadian and Northeast US hubs which could be expected to generate passenger and commercial travel demand for each alternative;
- c. The quality, capacity and traffic volumes on highway systems located

beyond Maine's borders, and the nature of cross-border traffic that could be serviced by various corridors;

- d. Estimated travel time savings to/from major hubs that might be achieved by each corridor; and
- e. The probability that each corridor would produce measurably different economic impacts from the remaining alternatives.

Engineering and environmental evaluations are beyond the scope of this analysis and were not used to either include or eliminate any concept from consideration. It should also be understood that the resulting corridors are broad concepts and should not be characterized as highway alignments. It is assumed that a variety of possible alignments could be developed to implement each concept.

After considerable deliberation, five conceptual corridors, including three upgrade alternatives and two corridors on new alignments, were selected for further analysis. These are identified on Map I-1 and described below¹:

Corridor Upgrade Alternatives

Corridor "A": *The Trans-Maine Trail (Alternate)* This corridor begins at the Canadian border in Vanceboro and proceeds westerly via Route 6 through Lincoln, Milo, Dover-Foxcroft, and Guilford to Abbot, then westerly via Route 16 to Bingham. The trail proceeds northerly along Route 201 to Jackman and Sandy Bay at the Canadian Border. (Includes Routes 6, 16 and 201)

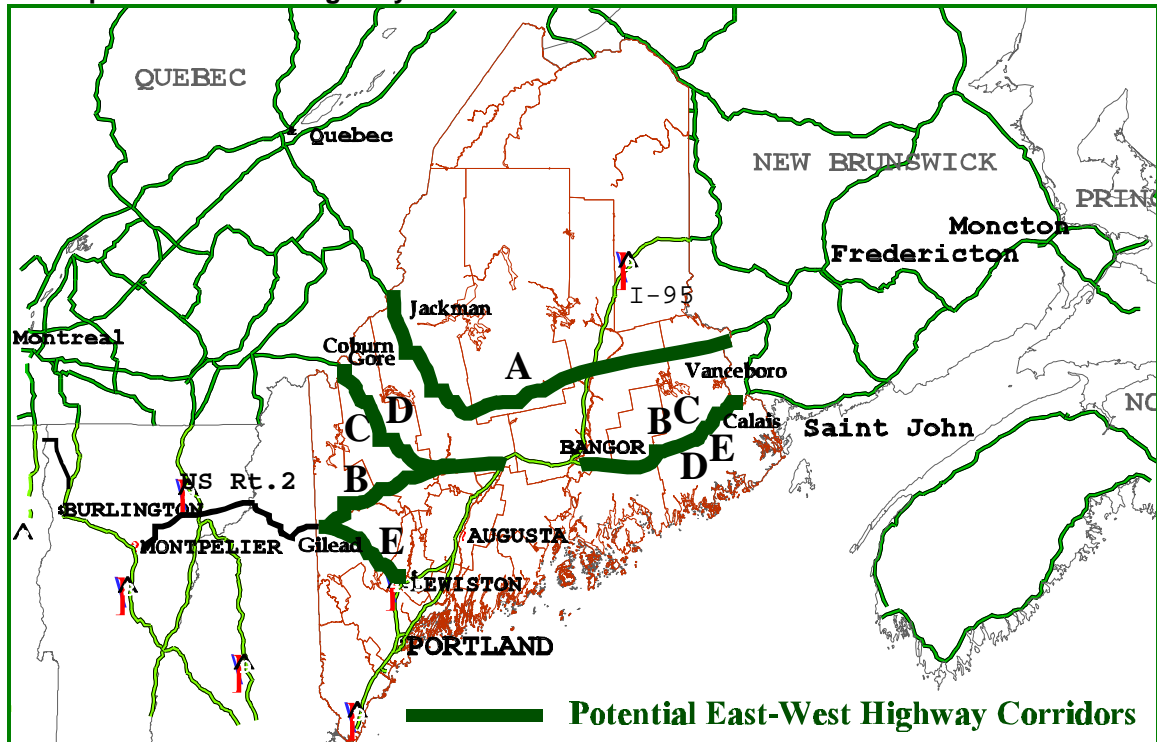
Corridor "B": *The East-West Highway* As defined in statute, this corridor begins at the Maine/New Brunswick border and proceeds westward along route 9 to Route 46 in East Eddington. The corridor continues southerly along Route 46 to Route 1A in East Holden, then westerly along Route 1A to I-395 in Brewer and connects with I-95 at or near Bangor. It then continues southwesterly along existing I-95, leaving I-95 in Newport. From this point, it continues westerly along Route 2 to the Maine/New Hampshire border at Gilead. (Includes Routes 9, 46 1A, I-395, I-95, & 2)

Corridor "C": *The East-West Highway (Alternate)* Beginning at the Maine/New Brunswick border, this corridor proceeds westward along Route 9 to Route 46 in East Eddington. The corridor continues southerly along Route 46 to route 1A in East Holden, then westerly along Route 1A to I-395 in Brewer and connects with I-95 at or near Bangor. It then continues southwesterly along existing I-95, leaving I-95 in Newport. From this point, it continues westerly along Route 2 to Route 27 in Farmington, then continues northwesterly along Route 27 to the Maine/Quebec border at Coburn Gore, linking Sherbrooke and Montreal via Quebec Route 10. (Includes Routes 9, 46, 1A, I-395, I-95, 2

¹ Corridor definitions were provided by the Maine Department of Transportation.

& 27)

Map I-1
Conceptual East-West Highway Corridors



Corridors on New Alignments

Corridor “D”: This corridor is a limited access 4-lane highway, predominately on new alignment, beginning at the Maine/New Brunswick border, at a location somewhere in the vicinity of Calais/Baileyville and connecting to Saint John Fredericton, and Moncton via NB Routes 1, 2 and 3. The corridor then proceeds westward along or south of Route 9, connecting with I-395 and I-95 at or near Bangor, and continues southwesterly along existing I-95, leaving I-95 at a point between Newport and Augusta. From this point, it continues northwesterly to the Maine/Quebec border at or near Coburn Gore, linking Sherbrooke and Montreal via Quebec Route 10.

Corridor “E”: Also a limited access 4-lane highway, predominately on new alignment, this corridor begins at the Maine/New Brunswick border at a location somewhere in the vicinity of Calais/Baileyville and connecting to Saint John Fredericton and Moncton via NB Routes 1, 2 and 3. The corridor then proceeds westward along or south of Route 9, connecting with I-395 and I-95 at or near Bangor, and continues southerly along existing I-95/I-495, leaving I-95/I-495 at a point between Augusta and Gray. It then continues in a generally northwesterly direction to the Route 2 corridor crossing into New Hampshire at or near Gilead, linking New Hampshire, Vermont, and Montreal via Route 2 and I-89.

As shown above, the selected concepts include a mix of northern, central and southern routes, two-lane upgrades, and 4-lane limited-access options for providing a border-to-border, east-west highway connection across the state. These options serve different regions within the state and connect to different hubs to the east and the west of Maine. More importantly, the resulting economic impacts and user benefits from each alternative are likely to be distinguishable from the others, and will thereby provide a meaningful basis for comparison.

The collection and presentation of information in this report are intended to provide a sufficient baseline of information with which to evaluate the economic impacts of each east-west highway concept illustrated above. This progress report is organized around the above objectives and presented in three sections. Chapter II presents population, employment, market trend and forecast data for selected metropolitan areas in the Northeast US and Eastern Canada. Findings from prior studies of US/Canadian trade are also discussed in this section. Chapter III profiles existing conditions and traffic volumes along major transportation routes and facilities which service Maine, the Northeastern US and Eastern Canada. Chapter IV analyzes commodity flows by type, origin/destination and mode of shipment, into and out of the State of Maine and Atlantic Canada. The appendix to this report also contains detailed tables which provide the source data for many of the findings presented in the text.

The following section provides a summary of the overall findings of the baseline research presented in Chapters II through IV, and their potential implications for the development of an east-west highway through Maine:

Summary Findings

1. **Although US/Canada trade has grown rapidly in recent years, very little of this increased activity has flowed through Maine. Maine's opportunities to increase its share of Canadian trade appear to be linked to Canada's growing industrial centers in Southern Ontario and Southwestern Quebec. Significant characteristics of US/Canada trade include the following:**
 - Canada is a net exporter to the US. Canada has enjoyed a long-standing and growing trade surplus with the US. Measured in constant 1992 US dollars, the value of Canada's exports to the US grew at a 5.3% annual rate from 1988 through 1995, while imports from the US grew by 3.3% per year. Canada's trade surplus with the US has also increased in real terms, from \$11.3 billion in 1988 to \$30.6 billion in 1995. (These totals are expressed in 1992 constant US dollars.)
 - In monetary terms, trucks carry the dominant share of US-Canada trade. In 1995, trucks carried more than 66% of the dollar value of Canadian exports to the US and 90% of the value of US exports to Canada. Rail is used most heavily for the transportation of finished automobiles; wood, pulp and paper; and metal products. Trucks are the dominant transport mode for most other commodities.
 - The vast majority of bilateral trade also flows through the Eastern Canada and the Northeast US. Approximately 74% of the total 1995 value of Canadian exports to the US were delivered through the eastern border provinces of Ontario, Québec and New Brunswick. Similarly, 62.9% of total US exports to Canada were received through these same provinces.
 - The vast majority of cross border trade flows through Ontario. More than 86% of the total value of Eastern Canada's US exports, flowed through Ontario border crossings, compared to 11.8% for Quebec and 1.9% for New Brunswick. The value of US products imported into eastern Canada was similarly distributed, with 91% entering through Ontario, 7.9% through Quebec and only 1.1% entering through New Brunswick.
 - Trade between the US and Canada is concentrated within a few commodity groups and is heavily dominated by the automotive industry. Transportation equipment accounted for more than 30% (\$66.8 billion) of the total value of US/Canada trade in 1995, and more than 52% of Canada's \$30+ billion trade surplus with the US. In addition to transportation equipment, the two other categories of commodities with high levels of US-Canada trade were machinery & electronics (\$50.5 billion) and wood, pulp and paper products (\$24.8 billion). Together these three commodity groups accounted for nearly 61% of the total value of US-Canada trade in 1995.
 - The monetary value and growth of bilateral trade between Northern New England, New Brunswick and Quebec is modest compared to the other border regions. Of the approximate \$61 billion increase (real growth) in US-Canada trade between 1988 and 1995, more than half has flowed between Michigan and Ontario, 29% has flowed between Northern/Western New York State and Ontario/Québec, 19% has been captured by the western border regions. Less than one percent has flowed through New Brunswick and Maine.

- Although only a small fraction of total US/Canada trade flows through the eastern-most section of the US/Canadian border, from Vermont to Calais/St. Stephen, the value of this trade still totaled nearly \$3.0 billion in 1995. Nearly 72% of that value consisted of Canadian exports to the US. The total value of cross-border trade between Northern New England and New Brunswick/Quebec grew by roughly \$480 million in real terms from 1988 to 1995.
 - A forecasting model of US/Canadian trade, developed for the Eastern Border Transportation Coalition in 1997, projects that bilateral trade will grow at an average annual rate of between 4% to 7% over the next 20 years. The impact of these trade flows will cause cross-border truck traffic along the Northern New England border with New Brunswick/Quebec to grow at an average annual rate of between 1.5 and 2.8% to the year 2015.
- 2. Maine's larger export sectors, including agricultural, paper, and wood products industries, are areas where Canada enjoys strong trade surpluses with the US. Due in part to this factor, Maine has a large trade deficit with Canada .**
- The US enjoys a trade surplus with Canada in relatively few major commodity groups. Machinery and electronics is the single commodity group in which the US had a major trade surplus with Canada (of more than \$12.2 billion) in 1995. The US also had modest trade surpluses in chemicals (\$1.35 billion), textiles (\$600 million), rubber and plastics (\$390 million) and stone, ceramic and glass products (\$280 million). In other major commodity groups, Canada had substantial trade surpluses with the US. These groups included transportation equipment (\$16 billion), wood, pulp & paper products (\$13.6 billion), minerals (\$12.9 billion), metal products (\$3.8 billion) and agricultural products (\$580 million).
 - In 1995, Maine ranked 17th among all US States as a destination for Canadian goods, but was not ranked among the top 20 US States in terms of exports to Canada. Maine's trade deficit with Canada has also grown rapidly over the past 5 years. Measured in US dollars, Maine imported nearly \$1.9 billion worth of Canadian products in 1998, while exporting less than \$584 million. Trade imbalances occurred in all provinces except Ontario. Maine's estimated 1998 trade deficit with Canada totaled nearly \$1.3 billion, compared to a deficit of only -\$572 million in 1993.
 - Despite this trade imbalance, Canada is still Maine's most important export market, ahead of Europe and Asia. The majority of Maine's exports to Canada are destined for Quebec and Ontario. Trend data indicate that more than two-thirds of Maine's exports, measured in terms of value, are shipped "westbound" to Quebec, Ontario and western Canada. By contrast, roughly 60% of the State's Canadian imports are received from the east via the Atlantic Provinces.
 - The majority of Maine's trade with Canada (both imports and exports) is in natural resource-based commodities. Maine's Canadian imports include large quantities of energy products (petroleum, coal and electricity) and wood pulp

imported from New Brunswick, along with softwood lumber imports from Quebec. The value of imported wood pulp, lumber, news print, fuel and electricity represents nearly 47% of Maine's total Canadian imports.

- In contrast to Maine's largest exported commodities, New England's Canadian exports are concentrated in high technology equipment, electronic components, fabricated machinery parts and assemblies, medical and diagnostic equipment, aerospace equipment, seafood and agricultural products. Due to the high values associated with these products, Massachusetts, Connecticut and Vermont had higher Canadian exports than Maine in 1998.

3. The dominant share of Canada's economic and population growth over the next 20 years is expected to occur in the Country's major urban markets located to the west of Maine. By comparison, growth prospects for the Atlantic Provinces, particularly areas outside of Metropolitan Halifax, are very limited.

- Like the U.S., Canada's employment growth over the past decade has been led by high-technology, high-knowledge-intensive industries, both in the manufacturing and service sectors. Nation-wide, Canada's high-technology employment has expanded by more than 1.0 million (23%) since 1987. Over the same period, employment in medium- and low-technology sectors, including natural resource-based industries, was largely flat.
- Ontario is projected to remain the growth engine of the Canadian economy, with real GDP growth of 3.3% per year over the next decade. A significant structural characteristic of Canada's economy is the fact that 53% of Canada's entire high-tech job base is located within the nation's seven largest metropolitan areas. Consistent with these trends, employment and population forecasts indicate that Canada's major urban centers, and Toronto in particular, will grow faster than its smaller cities and non-metropolitan areas for the foreseeable future.
- The Atlantic Provinces represent only minor percentage of Canada's economy. Canadian GDP totaled just under \$798 billion (\$Can) in 1996. The four Atlantic Provinces, combined, contributed less than 6% to Canada's GDP in 1996, while Quebec and Ontario represented 22% and 41%, respectively. The combined GDP of the four Atlantic Provinces in 1996 totaled \$47.7 billion (\$Can), less than 15% of Ontario's GDP of \$323 billion.
- Technological trends in the Canadian economy favor high-tech durable goods manufacturing over traditional industries. Electrical products, communications, business services, wholesale trade and chemical manufacturing industries are all projected to grow by more than 3% annually. Because most of these "high-growth" industries are concentrated in Ontario, overall growth forecasts for Ontario are more favorable than other parts of the country.
- Rising labor productivity and high rates of capital investment are key to future Canadian economic growth. The continued competitiveness of Canada's high-tech industries will depend upon maintaining rapid technological change. These demands are projected to generate high levels of investment in industrial

machinery and equipment, as well as demand for business services. This demand should create growing export opportunities for U.S. firms.

- Canada's inflation rate is projected to remain below the US over the near term. Canadian inflation is expected to average 1.7% between 1998 and 2000, compared to a 2.6% average rate in the U.S. This factor, along with Canada's positive trade balance, should help to stabilize and eventually strengthen the Canadian dollar relative to the U.S. These developments should work to reduce currency barriers which have constrained Canadian travel and spending in the U.S. during most of the 1990s. As a popular destination for Canadian travel, Maine would obviously benefit from such a development.
 - In the aggregate, the population of Eastern Canada has been growing faster than New England over the past several years. However, more than 73% of the total population gain recorded in Eastern Canada since 1992 has occurred within Ontario. According to Statistics Canada, the combined populations of the six Eastern Provinces totaled more than 21.2 million in 1997. Ontario's growth from 1992 to 1997 was roughly 761,000, nearly 4 times the recorded population increase in New England over the same period. The Province of Quebec also experienced significant population growth of more than 259,000 (a 3.6% increase). Nova Scotia's population also grew by 23,000 (3.6%) from 1992 to 1997, roughly 3 times the total gain recorded in the State of Maine. New Brunswick and PEI experienced nominal gains of 8,900 and 5,800, respectively, while Newfoundland's population declined by more than 19,900.
 - The six Eastern Provinces had an estimated combined total employment of more than 9.6 million in 1997. Roughly 56% of that total job base is located in Ontario. Quebec's economy is roughly the size of Massachusetts, while Ontario's economy is larger than Massachusetts, Connecticut and Rhode Island, combined. Collectively, the four Atlantic Provinces had a total employment base of 960,000 in 1997. This total was roughly 14% lower than the number of jobs in Maine and New Hampshire combined. Maine's economy has also grown at a faster rate than the Atlantic Provinces (with the exception of PEI) since 1992.
 - Economic growth in Ontario and Quebec should far exceed the Atlantic Provinces over the next decade. Quebec's economy is projected to add 350,000 jobs by 2008. In addition, Quebec's population is expected to grow at a rate of 0.4% per year, expanding by more than 292,000 and creating more than 274,000 households by 2008. Job growth in Ontario is forecast at a 1.8% annual rate through 2008, which is projected to create more than 1.1 million jobs by the end of the forecast. Population and households are projected to grow at corresponding rates of 1.1% and 1.5% per year, respectively. The remaining Atlantic Provinces are projected to achieve a very modest expansion of less than 65,000 jobs (8.5%) by 2008, with more than 60% of that projected job growth occurring in Nova Scotia. The remaining Atlantic Provinces are also expected to experience minimal net gains in population and households over the period.
- 4. Maine's economic growth during the 1990s actually compares favorably in percentage terms to most other States in the Northeastern US. Nearly all of the northeastern states are projected to slow in terms of population and job growth over the next two decades.**

- Population and employment trends and forecasts for Maine and 12 other Northeastern US States were obtained from the U.S. Department of Commerce, Bureau of Economic Analysis (BEA). The source provided annual measurements of employment by industry, population and Gross State Product from 1969 to the present, as well as forecasts to the year 2045. The BEA forecast for Maine was reasonably consistent to internal forecasts generated by the State Planning Office. Highlights from that forecast are summarized below:
- In total, Maine's population is expected to grow by 71,000 from 1990 to 2000 and 275,000 (21.5%) between 2000 and 2025. BEA also forecasts that Maine's population will grow at a slightly faster annual rate from 2000 to 2015 (averaging 0.8% per year) that it did during the 1990s. The 0.6% rate of annual population growth in Maine during the 1990s is in the middle of the range of the other northeastern states, while the 0.8% annual growth rate forecast from 2000 to 2015 is higher than most of the Northeast.
- In percentage terms, the outlook for the population growth in much of the Northeast US is slower than Ontario and comparable to Quebec. Annual rates of population growth for the Northeast US states are expected to fall within a range of 0.5% to 0.9% from 2000 to 2015. Canada's population is projected to expand at average annual rates of between 0.7% and 1.4% to the year 2016. Under a "medium growth" scenario within this range, Ontario's population is projected to grow by nearly 1.5% per year and Quebec by 0.7%. The remaining Atlantic Provinces are projected to experience relatively nominal population growth of well under 0.5% per year.
- Growth in total employment among northeastern U.S. states during the 1990s shows significantly more volatility than population, due to the varying impacts and rates of recovery from the recession of 1990-91. The mid-western and northern New England states have exhibited the fastest rates of job growth during the 1990s, ranging from 0.8% to 1.4% annually, while Connecticut, Rhode Island and New York have had the slowest job growth (0.2% to 0.5% per year). Maine's economy is projected to add a total of 57,000 jobs by the end of the decade, an annual growth rate of 0.8%.
- According to BEA's forecasts, the northeastern states are projected to maintain very modest annual growth rates in total employment of between 0.5% to 1.0% from 2000 to 2015. Employment growth for the New England States is projected between 0.8% and 1.0% annually. Future job growth in New York and New Jersey is projected to accelerate slightly in comparison to the past decade, while Ohio, Indiana, Michigan, Illinois and Pennsylvania are projected to experience a slowdown in job growth. BEA's longer range employment outlook (2015 to 2025) calls for job growth to slow throughout the northeastern states, to annual rates of 0.4% or less.
- Maine's employment growth during the 1990's has varied greatly among the State's 16 Counties. During the post-recession recovery from 1992 to 1997, seven Maine counties either lost employment or experienced growth rates below 1% per year, five counties generated job gains ranging from 1% to 2% and the remaining counties generated annual job growth exceeding 2% per year.

5. With the exception of Calais/St. Stephen, existing traffic volumes at

Maine's border crossings are light.

- Maine's National Highway System consists of 367 miles of Interstate highways, and 903 miles of principal arterial roadways. While interstates and principal arterial roadways comprise only about 12 percent of the total state system mileage, they serve over 60 percent of the total vehicle-miles of travel. Local roads comprise 61 percent of total road mileage but carry only about 11 percent of total vehicle-miles of travel. Maine's transportation system generates 13 billion vehicle-miles of travel (VMT) on the highway system.
- Over the next 20 years, travel in Maine is expected to grow by approximately 18 percent, compared to a projected 6 percent growth in population and 12 percent growth in employment. These projections indicate that Maine residents will continue to travel more frequently and over increasing distances in the future.
- According to 1997 border crossing data, approximately 4.3 million passenger vehicles and 450,000 heavy vehicles entered Maine at 11 Canadian border crossing locations. This translated to an average of roughly 11,900 incoming passenger vehicles and 1,230 incoming trucks per day at all locations. Approximately 35% of all incoming Canadian traffic entered Maine through Calais. Calais and Madawaska account for about 60 percent of incoming passenger vehicles, while Calais, Houlton, and Jackman together account for about 75 percent of total incoming trucks
- Consistent with the above border crossing counts, average daily traffic volumes along most of the major roadways located along Maine's borders are fairly light. Average annual daily traffic counts (AADT) taken at points near the State's major border crossings are summarized below:

<u>Route (Location)</u>	<u>AADT</u>
I-95 (Houlton)	2,300
Route 9 (Calais)	7,600
US Route 201 (Jackman)	1,420
Route 1 (Fort Kent)	2,000
Route 6 (Vanceboro)	580
Route 16/27 (Stratton)	1,900

- Available traffic volume data suggest that the daily number of interprovincial trips along the Trans-Canada Highway from the Atlantic Provinces to points west of Quebec City, is limited. This observation is based upon the steadily declining traffic counts along major segments of the Trans-Canada moving eastward from Montreal.

<u>Corridor Segment</u>	<u>AADT</u>
Montreal and points west	136,000
Montreal to Quebec City	25,000
Quebec City to Riviere du-Loup	10,000
Riviere du-Loup to NB Border	5,000
Quebec Border to Fredericton	5,000
Fredericton to Route 1	5,000

6. The flow of existing commodity traffic into and through Maine is primarily in a north-south direction. Despite Canada's importance to Maine as an export market, the volume (weight) of Maine commodities shipped to Canadian destinations is still modest compared to other US markets.

- Trucks are the dominant mode of commodity transport in Maine. In 1997, 11.2 million tons of cargo left the state of Maine and 7.0 million tons entered the State by rail, truck, or water. Tonnage leaving the state travels primarily by truck, which accounted for 95.2% of outbound tonnage in 1997. Trucks also carried 52.6% of total tonnage entering the state. Much more tonnage enters the state via water transport than leaves the state by the same mode; 41.5% of total 1997 tonnage entered Maine by boat, compared to only 1% of total outbound tonnage.
- Only a small percentage of total tonnage transported into and out of the state is carried by rail. Rail accounted for only 3.8% of outbound and 5.8% of inbound tonnage in 1997.
- Maine's top three exported products in terms of total tonnage (paper, converted paper/paperboard products, and field crops) are also the top commodities moved by truck. Of a total of 9.3 million tons of outbound freight carried by truck, nearly 55% consisted of these three commodity groups.
- The Southeast US is the largest destination for cargo leaving the state of Maine, receiving 1.9 million tons of cargo in 1977. The Southeast accounted for 17.3% of the total tonnage exported from Maine to other US destinations in 1997. The Chicago and New York City/New Jersey areas are the second and third largest destinations for goods leaving the state with 1.4 million tons moving to each of the two areas. The Southwest, Washington D.C., and Boston follow the top 3 destinations closely, with each receiving between 790,000 (Boston) and 894,000 (Southwest) tons of cargo in 1997.
- Commodities shipped to all of Canada account for just 4% of total outbound truck freight (tonnage) from Maine. Tonnage moving by truck from Maine to Canada is highly concentrated, with just over 70% of total truck tonnage accounted for by four commodities; sawmill or planing mill products, paper, waste or scrap and primary forest products. Together these four groups accounted for nearly 72% of the 446,000 tons of outbound truck freight shipped from Maine to all of Canada. Nearly 51% of Maine's outbound Canadian shipments were delivered to Quebec and nearly 70 percent of total Canada-bound tonnage was shipped to points to the west of the state.
- The largest commodity groups (by weight) that are shipped into Maine by truck tend to fall under the categories of building and paving materials (445,000 tons), agricultural and industrial chemical products (310,000 tons), paper and forest products (301,000 tons) and a variety of food products and consumer goods, including automobiles. From the US, the majority of product is shipped from Southern New England, the Middle Atlantic and Southeastern US States (about 2.3 million tons). Roughly 327,000 tons arrive from US locations to the west of Maine, such as Detroit and Cleveland), which may be potential users of an east-west highway.

- Of the nearly 1.9 million tons of Canadian freight shipped into Maine by truck, more than 60% consisted of sawmill, wood products or primary forest materials. Maine also received a significant volume of motor vehicles and equipment (141,000 tons) from Canadian points of origin. Nearly 52% of the total tonnage was received from New Brunswick and another 34% from Quebec. Ontario also accounted for 11% of the total inbound product, or slightly less than 210,000 tons.
7. **The flow of east-west commodity traffic through the Atlantic Provinces is heavily influenced by rail. As a result, the overall weight of commodities currently moved by truck in the four Atlantic Provinces, combined, is less than the State of Maine.**
- Over land freight movements into and out of the Atlantic Provinces are more likely to be carried by rail. In 1997, 8.3 million tons of freight left Atlantic Canada, and 8.5 million tons entered the region from other Canadian and US locations. For out-bound shipments, 54.1% were transported by truck, and 45.9% by rail. Totals for inbound freight were essentially reversed, with 55% carried by rail and 45% by truck. These estimates indicate that the total weight of over-land freight moved into and out of the Atlantic Provinces (combined) was higher than the State of Maine (16.8 million compared to 15.2 million tons). However, total tonnage carried by truck was substantially greater in Maine (14.3 million tons compared to 8.3 million tons).
 - Products exported from Atlantic Canada by truck are somewhat comparable to Maine, with a high composition of sawmill, wood, forest products and foodstuffs. These several commodity groups account for more than 2.9 million or 65% of the total outbound truck freight from the region. Approximately 1.9 million tons of this outbound truck freight was destined for Ontario and Quebec, roughly double the tonnage shipped to Maine. An additional 1.2 million tons of truck freight were likely to have been carried through Maine to destinations in Southern New England, the Mid-Atlantic and Southeastern U.S. Comparatively low volumes of truck freight appear to be shipped from the Atlantic Provinces to points west of Ontario, to either Canadian or US destinations.
 - Of the 3.8 million tons of inbound truck freight to Atlantic Canada, roughly 1.5 million tons (40%) were shipped from Quebec and Ontario. An additional large volume of truck shipments (1.7 million tons) was also received from the province of Saskatchewan. By contrast, truck shipments into the Atlantic Provinces from the US were limited, with Maine accounting for less than 4% of the total.

Detailed findings are presented in the following sections.

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II

Economic, Market and Trade Issues

Introduction

The purpose of the following section is to summarize and compare the overall population size, industry composition and long term growth prospects for various in-State, Northeast US and Canadian markets which could be served by an East-West Highway. The data presented below will be used in other phases of the analysis to develop long-range regional growth assumptions for use in traffic forecasting, and to project possible economic impacts of an east-west highway on individual communities and sub-state regions.

This section is organized into three parts and begins with a discussion of trends in cross-border trade, which was assembled from a review of prior studies. The discussion of US/Canada trade is followed by a review of available market information for Eastern Canadian and Northeastern US metropolitan areas that could be serviced by an east-west highway through Maine. The section concludes with a presentation of Maine economic trends and forecasts at the state, MSA and county levels. Particular attention is given to those areas of the State which could potentially be impacted by one or more of the conceptual highway corridors outlined in Map I-1.

Information presented in this section was assembled from the sources listed below:

- ▶ Standard & Poor's DRI, Canadian Economic Service, *Canadian Market Outlook: Metro Focus*, Summer 1998.
- ▶ Pan Atlantic Consultants, *An Analysis of Maine/Canada Trade with Policy Recommendations*, prepared for the Mainewatch Institute, January, 1995.
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- ▶ Shih-Miao Chin, Oak Ridge National Laboratory, "Estimating State-Level Truck Activities in America", *Journal of Transportation Statistics*, January, 1998.
- ▶ U.S. Department of Transportation, Bureau of Transportation Statistics, *Freight Transportation in Maine: Selected Data from Federal Sources*, October, 1996.

- ▶ Maine State Planning Office, "Short-Range Economic Forecast: Fall 1998", October, 1998.
- ▶ Maine State Planning Office, "Employment Growth by Industry Sector: 1997-2010", November 1998.
- ▶ Charles S. Colgan Ph.D., "Maine Economic Outlook", *New England Economic Project: Economic Outlook 1998-2002*, October, 1998 and May, 1999.
- ▶ Canadian Consulate General, *A Summary of New England-Canada Trade: 1998*, May, 1999.

Trends in U.S./Canada Trade

The purpose of this section is to provide a general overview of trends in cross border trade between the Northeast US and Eastern Canada, as an introduction to more detailed information which will be presented later in this report. Most of the trend data summarized below were assembled from two sources; (1) *An Analysis of Maine/Canada Trade with Policy Recommendations*, prepared for the Mainewatch Institute, January in 1995 by Pan Atlantic Consultants, and (2) *Trade and Traffic Across the Eastern US--Canada Border (Volumes I & II)*, prepared for the Eastern Border Transportation Coalition in March, 1998 by Parsons Brinckerhoff Quade & Douglas, Inc. Most recent available trade statistics were obtained for calendar year 1998 and are also reported. The following pages highlight overall trends in US/Canada trade by region by dollar value and by types of commodities. Chapter IV will examine commodity flows in much greater detail by origin/destination, tonnage and mode of transport.

- ▶ The US and Canada are each country's largest respective trading partner. In 1993, the US supplied roughly 71% of Canada's total merchandise imports and bought 78% of its exports. The value of cross border merchandise trade has been increasing at annual rates of 5 to 6 percent during the 1990s. Canada is also Maine's most important export market, ahead of Europe and Asia. Canada received roughly a third of the state's total exports in 1993.
- ▶ Approximately 86% of the total value of US exports to Canada are manufactured goods, with the balance comprised of food (5.5%), fuel/raw materials (4.7%) and all other goods (3.6%). The US also exports a significant volume of services, (with an estimated value of \$17.7 billion in 1993) to Canada. The composition of Canada's exports to the US is characterized by a larger presence of fuel/raw materials (18%), food (5.5%) and other goods (6.3%), and a corresponding reduction in the percentage of manufacturing exports.

A more recent and detailed analysis of US/Canada Trade was completed in early 1998 for the Eastern Border Transportation Coalition. The Study Area for this analysis included ports of entry located along the Eastern US-Canadian Border from Detroit, Michigan/Windsor Ontario to Calais, Maine/St. Stephen New Brunswick.² The analysis examined trends in the value of cross-border trade from 1988 through 1995 by region, commodity and mode of transport, and included forecasts of trade and traffic flows to

² The rest of Canada which was not included in the study included ports of entry along the US-Canadian border from Minnesota westward to Washington.

the year 2015. Highlights from that report include the following.

- ▶ Canada is a net exporter to the US. Canada has enjoyed a long-standing and growing trade surplus with the US. Measured in 1992 constant US dollars, bilateral US/Canada trade totaled more than \$234.6 billion in 1995, with \$132.6 billion of that total representing the value of Canadian exports to the US. Canada's trade surplus with the US has also increased in real terms, from \$11.3 billion in 1988 to \$30.6 billion in 1995. (These totals are also expressed in 1992 constant US dollars.)
- ▶ Despite the recession of 1990 and 1991, the dollar value of cross border trade along the US-Canadian border has been growing in real terms. The vast majority of bilateral trade also flows through the Eastern Canada and the Northeast US. Measured in constant 1992 US dollars, the value of Canada's exports to the US grew at a 5.3% annual rate from 1988 through 1995, while imports from the US grew by 3.3% per year. Approximately 74% of the total 1995 value of Canadian exports to the US were delivered through the eastern border provinces of Ontario, Quebec and New Brunswick. Similarly, 62.9% of total US exports to Canada were received through these same provinces.
- ▶ The vast majority of cross border trade flows through Ontario. Measured on the basis of value, Ontario ports of entry alone delivered nearly 64% of Canada's total US exports, and received 57% of Canada's US imports during 1995. Among the Eastern Provinces, Ontario's market dominance is even higher. More than 86% of the total value of Eastern Canada's US exports flowed through Ontario border crossings, compared to 11.8% for Quebec and 1.9% for New Brunswick. The value of US products imported into eastern Canada was similarly distributed, with 91% entering through Ontario, 7.9% through Quebec and only 1.1% entering through New Brunswick.
- ▶ The monetary value of bilateral trade between Northern New England, New Brunswick and Quebec is modest compared to the other border regions. Bilateral trade along the eastern-most section of the US/Canadian border, from Vermont to Calais/St. Stephen, totaled just under \$3.0 billion in 1995, with nearly 72% of that value consisting of Canadian exports to the US. The total value of cross-border trade between Northern New England and New Brunswick/Quebec grew by roughly \$480

Value of Cross-Border Trade Through Northern New England: 1988-95

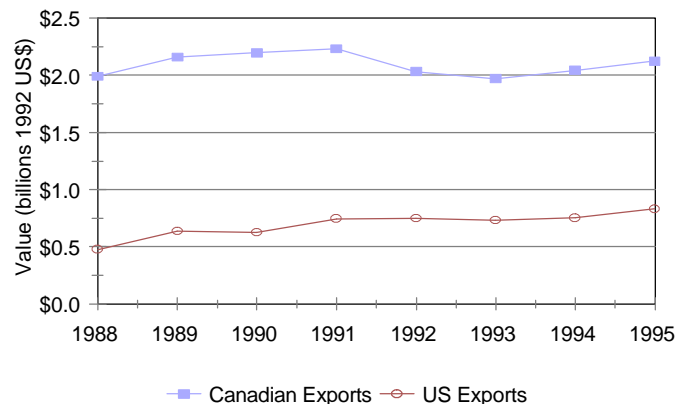


Figure II-1

million in real terms from 1988 to 1995. Although a significant increase, this total represented less than one percent of the approximate \$61 billion increase in US-Canada trade during the same period. By comparison, more than half of the real growth in US-Canada trade since 1988 has flowed between Michigan and Ontario, 29% has flowed between Northern/Western New York State and Ontario/Quebec, and 19% has been captured by the western border regions.

- ▶ In monetary terms, trucks carry the dominant share of US-Canada trade. In 1995, trucks carried more than 66% of the dollar value of Canadian exports to the US and 90% of the value of US exports to Canada. Rail is used most heavily for the transportation of finished automobiles; wood, pulp and paper; and metal products. Trucks are the dominant transport mode for most other commodities.
- ▶ Trade between the US and Canada is concentrated within a few commodity groups and is heavily dominated by the automotive industry. Transportation equipment accounted for more than 30% (\$66.8 billion) of the total value of US/Canada trade in 1995, and more than 52% of Canada's \$30+ billion trade surplus with the US. In addition to transportation equipment, the two other categories of commodities with high levels of US-Canada trade were machinery & electronics (\$50.5 billion) and wood, pulp and paper products (\$24.8 billion). Together these three commodity groups accounted for nearly 61% of the total value of US-Canada trade in 1995. Because the center of Canada's automotive industry is located in Southwestern Ontario near Detroit, it is not surprising that the vast majority of US-Canada trade flows through Michigan-Ontario ports of entry. In addition, many commodities classified in other categories, such as machine tools, primary and fabricated metal products, rubber & plastics, textiles, etc., are components of automotive production and further contribute to the region's dominance in terms of overall trade activity.
- ▶ The US enjoys a trade surplus with Canada in relatively few major commodity groups. Machinery and electronics is the single commodity group in which the US had a major trade surplus with Canada (of more than \$12.2 billion) in 1995. The US also had modest trade surpluses in chemicals (\$1.35 billion), textiles (\$600 million), rubber and plastics (\$390 million) and stone, ceramic and glass products (\$280 million). In other major commodity groups, Canada had substantial trade surpluses with the US. These groups included transportation equipment (\$16 billion), wood, pulp & paper products (\$13.6 billion), minerals (\$12.9 billion), metal products (\$3.8 billion) and agricultural products (\$580 million).
- ▶ Maine ranked 17th among all US States as a destination for Canadian goods, but was not ranked among the top 20 US States in terms of exports to Canada in 1995. As will be shown below, Maine has a large trade deficit with Canada. The value of Canadian exports to Maine totaled \$1.1 billion in 1995 (in 1992 constant \$), roughly 1.1% of the total value of Canada's US exports for that year. The real value Canadian exports to Maine grew at a 3.6% annual rate from 1988 to 1995, well below the rate of growth in total exports to the US.
- ▶ A forecast of US/Canadian trade, also developed for the Eastern Border Transportation Coalition in 1997, projects that bilateral trade will grow at an average annual rate of between 4% and 7% over the next 20 years. These percentages represent the low and high end of a range produced by alternative

forecasting methods developed for that analysis. The resulting allocation of these trade flows to the Northern New England border with New Brunswick/Quebec, forecasts principal Canadian commodity exports through the region to grow within a range of 1.0% to 2.2% annually. US export flows through Northern New England are projected to rise at rates ranging from 0.9% to 3.7% per year off a much smaller base. Although significant, these forecasted growth rates are roughly a third of the national averages and well behind growth rates which are forecast for other Eastern border regions. It should also be noted that these projections are absent of any assumed improvements to existing transportation systems.

- ▶ Despite these relatively low growth projections for commodity flows, growth in cross border traffic along the Northern New England border with New Brunswick/Quebec is expected to continue. Cross-border truck traffic is projected to grow within an average annual rate of 1.5% to 2.8% to the year 2015, while automobile traffic is similarly projected to increase between 1.3% and 2.5% per year. Because a major share of existing cross border traffic in these regions flows through Maine, it may be anticipated that these traffic forecasts will also apply to the state's border crossing locations.

Trends in Maine/Canada Trade

The latest available trade statistics for Maine/Canada Trade (and the other New England States) were obtained for Calendar year 1998 and are reported below.

- ▶ As shown in Table II-1, roughly 44% of Maine's \$584 million in Canadian exports were destined for Quebec in 1998. The combined value of Maine's "westbound" exports to Quebec and Ontario of nearly \$383 million (66% of the total) exceeded the value of exports to New Brunswick and Nova Scotia (\$187 million) by a significant margin. The majority of products exported to the rest of Canada were also shipped westbound, with British Columbia representing the most important destination among other provinces. It is also significant to note that Maine's 1998 exports to each of the Western Provinces of Manitoba, Saskatchewan, Alberta and British Columbia were substantially higher than the state's combined exports to the remaining Atlantic Provinces of Nova Scotia, PEI and Newfoundland.

Table II-1
Value of Maine Imports/Exports with Canada by Province: 1998

PROVINCE	Exports [1]		Imports		Trade Balance	
	\$ Value	% of Total	\$ Value	% of Total	\$ Value	% of Total
New Brunswick	\$186.6	32.0%	\$996.4	53.3%	(\$809.8)	63.0%
Quebec	\$256.7	44.0%	\$633.3	33.9%	(\$376.6)	29.3%
Ontario	\$126.6	21.7%	\$100.8	5.4%	\$25.8	-2.0%
Nova Scotia	\$0.9	0.2%	\$114.2	6.1%	(\$113.2)	8.8%
Rest of Atl. Canada [2]	\$0.7	0.1%	\$0.0	0.0%	\$0.7	-0.1%
Western Canada [3]	\$12.3	2.1%	\$24.9	1.3%	(\$12.6)	1.0%
Canada Total:	\$583.9	100.0%	\$1,869.6	100.0%	(\$1,285.7)	100.0%

[1] All values are in millions of 1998 US \$

[2] Includes PEI, Newfoundland and Labrador

[3] Includes Manitoba, Saskatchewan, Alberta, British Columbia, the Yukon & Northwest Territories.

- Measured in dollar value, Maine imports substantially more products from Canada than it exports, with roughly half of the total value of imports originating in New Brunswick. Maine recorded a trade deficit of nearly \$1.3 billion in 1998. Trade imbalances occurred in all provinces except Ontario, where Maine had a modest surplus of \$25.8 million. Roughly 63% of Maine's total trade deficit of -\$809 million, originated in New Brunswick alone. Maine's trade imbalance with Quebec totaled nearly -\$377 million, followed by Nova Scotia with -\$113 million. Maine's trade deficit with Canada has also been growing in recent years, up from -\$572 million (in current dollars) in 1993.

Table II-2

**Value of Maine Imports/Exports with Canada by
Major Commodity Groups: 1998**

Commodity	Exports [1]		Imports	
	\$ Value	% of Total	\$ Value	% of Total
Wood Pulp & Similar Pulp			\$333.0	17.8%
Petroleum and Coal Products			\$259.5	13.9%
Electricity			\$114.5	6.1%
Crude Wood Materials	\$111.9	19.2%		
Softwood, Lumber	\$17.3	3.0%	\$95.6	5.1%
Newsprint Paper			\$68.0	3.6%
Fish and Marine Animals	\$51.1	8.8%		
Other Fishery Foods & Feeds			\$67.0	3.6%
Inorganic Chemicals			\$64.9	3.5%
Other Motor Vehicles, Parts	\$15.1	2.6%	\$47.5	2.5%
Vegetables, Meats & Preparations	\$6.7	1.1%	\$36.4	1.9%
Paper & Paperboard	\$31.6	5.4%		
Waste & Scrap Materials	\$11.5	2.0%		
Electrical, Telecommunications Equip.	\$17.8	3.1%		
Stationer's & Office Supplies	\$10.0	1.7%		
All Other Commodities	\$310.8	53.2%	\$783.2	41.9%
Canada Total:	\$583.9	100.0%	\$1,869.6	100.0%

[1] All values are in millions of 1998 US \$

SOURCE: "A Summary of New England-Canada Trade: 1998", Office of the Canadian Consulate General, May 1999. Original source data provided by Statistics Canada.

- The distribution of Maine's Canadian trade by major categories of commodities is summarized in Table II-2. The majority of Maine's trade with Canada (both imports and exports) is in natural resource-based commodities.³ The high value of Canadian imports was attributable to energy products (petroleum, coal and electricity) and wood pulp imported from New Brunswick, along with softwood lumber imports from Quebec. The value of imported wood pulp, lumber fuel and electricity totaled \$707 million in 1998 and represented nearly 38% of Maine's total Canadian imports last year.
- Among other commodities, the relatively small volume of Maine exports of industrial machinery and electronic components were shipped primarily to Ontario, while exports of Maine paper products were fairly evenly distributed throughout Canada. The major share of Maine's exports of fish and agricultural products were sent to New Brunswick. Maine's imports of most Canadian

³ More detailed information on commodity flows is presented in Chapter IV.

chemical products originated in Quebec and Ontario.

- ▶ In contrast to Maine's exported commodities, New England's largest Canadian exports are concentrated in high technology equipment, electronic components, fabricated machinery parts and assemblies, medical and diagnostic equipment, aerospace equipment, seafood and agricultural products. Due to the high values associated with these products, Connecticut, Vermont and Massachusetts all had higher Canadian exports than Maine.
- ▶ Despite this different export mix, the combined New England States ran a large trade deficit with Canada in 1998. Total Canadian imports to New England were valued at \$19.3 billion (\$Can), while the region's exports to Canada totaled only \$11.5 billion (\$Can). Connecticut was the only NE State to run a trade surplus with Canada (\$322 million) in 1998. Maine shipped less than 7.6% of the value of New England's Canadian exports in 1998, ahead of NH and RI, but received more than 13.2% of New England's imports of Canadian goods. Detailed New England-Canada Trade data are provided in the Appendix.

Canadian Market Profile

Canadian Economic Overview

Canada occupies 3.8 million square miles and is the second largest country in the world in terms of land area. Despite Canada's massive size, the country's population totals only 30.2 million according to latest estimates provided by Statistics Canada. Roughly 77% of that population resides within urban areas and more than 80 percent is located within 125 miles of the U.S. border.

Canada has the seventh largest industrial economy in the world and enjoys comparable living standards to the U.S. Like the U.S., Canada's employment growth over the past decade has been led by high-technology, high-knowledge-intensive industries, both in the manufacturing and service sectors. Nation-wide, Canada's high-technology employment has expanded by more than 1.0 million (23%) since 1987, to a current (1997) level of 5.5 million jobs. Within the high-technology sector, employment in information-technology, led by telecommunications, software and computer equipment industries, expanded at an even faster rate (more than 38%). Over the same period, employment in medium- and low-technology sectors, including natural resource-based industries, was largely flat.

Although high-technology industries are located throughout Canada and have been growing in all provinces, a significant structural characteristic of Canada's economy is the fact that more than 70% of the country's high-tech employment (and 65% of total employment) is concentrated in its 25 "Census Metropolitan Areas" or CMAs. More importantly, 53% of Canada's entire high-tech job base is located within the nation's seven largest CMAs.⁴ Canada's rapidly growing information-technology industries have an even higher concentration of employment (80% of the total) in the Country's largest urban areas. The fact that most of Canada's largest and faster growing CMAs are physically distant from Maine, may make it more difficult to tap the growth centers of Canada's economy via an east-west highway.

Consistent with these trends, employment and population forecasts provided by both Standard & Poor's DRI and Statistics Canada indicate that Canada's major urban centers will grow faster than its smaller cities and non-metropolitan areas for the foreseeable future. Ontario is projected to remain the growth engine of the Canadian economy, with real GDP growth of 3.3% per year over the next decade. Growth prospects for the Atlantic Provinces are substantially weaker, particularly for areas outside of the City of Halifax. Out-migration and high unemployment are projected to characterize much of Atlantic Canada over the next decade.

Other summary characteristics of the Canadian Economy, as reported by Standard & Poor's DRI, are highlighted below:

- Canada's population has a significantly older age distribution than the U.S. Labor force growth is projected to slow significantly (to 1.0% per year) in the coming decade, as Canada's prime working-age population (25-54) begins to decline relative to total population. Slow labor force growth over the next decade will have a

⁴ Canada's largest metropolitan areas are Toronto, Montreal, Vancouver, Ottawa-Hull, Calgary, Edmonton and Winnipeg.

corresponding downward influence on household income growth and spending on consumer goods. Consumer spending is projected to grow at a 2.5% annual rate between 2000 and 2010.

- Rising labor productivity and high rates of capital investment are key to future Canadian economic growth. The continued competitiveness of Canada's high-tech industries will depend upon maintaining rapid technological change. These demands are projected to generate high levels of investment in industrial machinery and equipment, as well as demand for business services. This demand should create growing export opportunities for U.S. firms.
- Technological trends in the Canadian economy favor high-tech durable goods manufacturing over traditional industries. Electrical products, communications, business services, wholesale trade and chemical manufacturing industries are all projected to grow by more than 3% annually. Because most of these "high-growth" industries are concentrated in Ontario, overall growth forecasts for Ontario are more favorable than other parts of the country. Ontario's gross domestic product (GDP) is projected to grow at a 3.3% annual rate over the next five years. Atlantic Canada's GDP is projected to grow by 2.5% annually over the same period.
- The current Asian Crisis, coupled with Canada's structural economic problems outside of the high-tech sector, will cause unemployment to remain well above US average in the near term. Standard & Poor's DRI projects that Canada's unemployment rate will remain above 9.0% to the year 2000, decline to an average of 7.7% by 2005 and gradually fall below 7% by the end of the next decade. Tight labor markets will begin to act as a constraint to economic growth after 2005.
- Canada's inflation rate is projected to remain below the US over the near term. Canadian inflation is expected to average 1.7% between 1998 and 2000, compared to a 2.6% average rate in the U.S. This factor, coupled with Canada's positive trade balance, are projected to stabilize and eventually strengthen the Canadian dollar relative to the U.S. These developments should work to reduce currency barriers which have constrained Canadian travel and spending in the U.S. during most of the 1990s.
- Prospects for Canadian trade growth remain strong. Canadian exports projected to grow at 5.2% per year beyond 2000, while imports are projected to grow at a faster 5.5% annual rate. These forecasts favor a continuation of growth in cross-border commercial traffic and trade with the U.S.

Table II-3

Canada's Top 10 Industries

(Average Annual Percent Growth, 1998-2021)

1. Electrical Products	4.2
2. Communications	3.6
3. Business Services	3.5
4. Wholesale Trade	3.3
5. Chemicals	3.2
6. Rubber & Plastics	2.9
7. Transportation Equipment	2.8
8. Metal Fabricating	2.5
9. Finance, Insurance & Real Estate	2.4
10. Primary Metals	2.4

Source: Standard & Poor's DRI

- The Canadian economy has added approximately 1.2 million payroll jobs, an 11% increase, since early 1994. Total seasonally adjusted employment in Canada exceeded 11.6 million in mid-1998, up from a level of 10.4 million at the beginning of 1994.⁵

The national recovery from a severe

recession in the early 1990's continued through the early part of 1998, with total employment growth averaging 2.6 percent per year over the past four years. As is shown in the graph, seasonally adjusted employment growth slowed significantly and was essentially flat over the first half of 1998. More recent data indicate that job growth resumed over the latter half of the year and into early 1999.

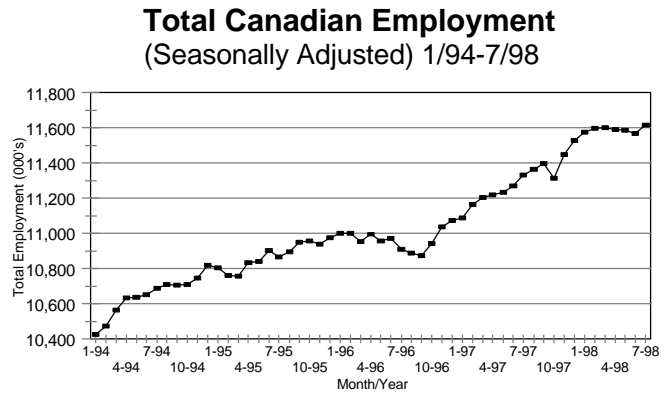


Figure II-2

Economic Overview: Eastern Provinces

Provincial Population Trends

Current (1997) population estimates for Canada's Eastern Provinces are shown on Map II-1 on the following page. For comparison, estimates are also provided for the six New England States and the State of New York. Population growth trends from 1992 to 1997 are also summarized in the accompanying table. Because of their proximity to Maine, it is assumed that the majority of travel demand for an east-west highway through Maine, would be generated within these states and provinces.

The combined populations of the 13 states and provinces shown on the map totals 52.6 million. New York is the largest population center with nearly 18 million people, followed by Ontario (11.4 million), Quebec (7.4 million) and Massachusetts (6.1 million). In sharp contrast to the major urban population centers located to the west and south of Maine, the Atlantic Provinces of Newfoundland, Prince Edward Island (PEI), Nova Scotia and New Brunswick, have populations ranging from 137,000 to 950,000. The combined population of the four Atlantic Provinces totals 2.4 million, roughly double the population of the State of Maine, but is distributed over a much larger land area. It is also significant to note that the combined population of the Atlantic Provinces is less than a third of the size of Quebec and significantly smaller than the City of Montreal alone.

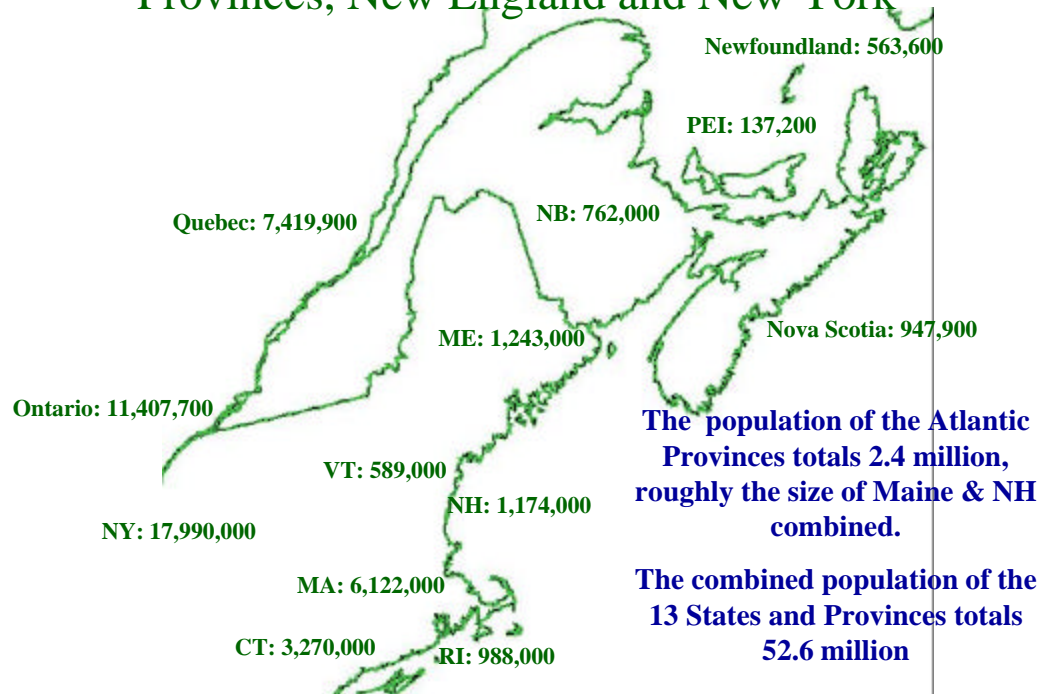
⁵ Source: "Seasonally Adjusted Estimates of Employment for all Employees", Employment, Earnings and Hours, 1998, Statistics Canada. Latest reported data was for the month of July, 1998. This graph reports wage and salary or "payroll" employment only. Totals exclude self-employed individuals, military personnel and unpaid family workers.

Table II-4
Comparison of Provincial & New England
Population Change: 1992 to 1997

CANADIAN PROVINCES	1992	1997	Change: 1992-1997		
			Total	% Change	Ann. Rate
Newfoundland	583,551	563,641	(19,910)	-3.4%	-0.7%
Prince Edward Island	131,448	137,244	5,796	4.4%	0.9%
Nova Scotia	924,737	947,917	23,180	2.5%	0.5%
New Brunswick	753,135	762,049	8,914	1.2%	0.2%
Quebec	7,160,562	7,419,890	259,328	3.6%	0.7%
Ontario	10,646,801	11,407,691	760,890	7.1%	1.4%
Total: Eastern Canada	20,200,234	21,238,432	1,038,198	5.1%	1.0%
NEW ENGLAND					
Connecticut	3,276,000	3,270,000	(6,000)	-0.2%	-0.0%
Maine	1,235,000	1,243,000	8,000	0.6%	0.1%
Massachusetts	5,994,000	6,122,000	128,000	2.1%	0.4%
New Hampshire	1,114,000	1,174,000	60,000	5.4%	1.1%
Rhode Island	1,001,000	988,000	(13,000)	-1.3%	-0.3%
Vermont	570,000	589,000	19,000	3.3%	0.7%
Total: New England	13,190,000	13,386,000	196,000	1.5%	0.3%

SOURCE: Statistics Canada & the New England Economic Project

1997 Population Estimates for Eastern Canadian Provinces, New England and New York



Map II-1

According to Statistics Canada, the combined populations of the six provinces shown in Table II-4 totaled more than 21.2 million in 1997. This population is nearly 20 percent larger than the State of New York and 60 percent larger than New England's estimated 1997 population of 13.4 million. Statistics Canada estimates that Eastern Canada grew faster than New England from 1992 to 1997, adding more than 1.0 million residents (a 5.1% increase) over that time. This contrasts to New England's population growth of less than 200,000 (1.5%) since 1992.

More than 73% of the total population gain recorded in Eastern Canada since 1992 has occurred within Ontario. Ontario's 5-year growth of roughly 761,000, was nearly 4 times the recorded population increase in New England over the same period. The Province of Quebec also experienced significant population growth of more than 259,000 (a 3.6% increase). Nova Scotia's population also grew by 23,000 (3.6%) from 1992 to 1997, roughly 3 times the total gain recorded in the State of Maine. New Brunswick and PEI experienced nominal gains of 8,900 and 5,800, respectively, while Newfoundland's population declined by more than 19,900.

Table II-5
Population Projections: 1996 - 2016
Canada and Eastern Provinces

Province	Total Estimated Population				
	1996	2001	2006	2011	2016
Newfoundland	571,657	577,300	566,200	550,900	533,300
Prince Edward Island	136,743	138,100	141,200	143,700	145,700
Nova Scotia	943,219	952,800	964,100	971,500	975,600
New Brunswick	762,031	768,000	771,300	771,200	770,100
Quebec	7,388,028	7,727,000	8,004,200	8,275,500	8,491,100
Ontario	11,258,391	12,274,000	13,220,500	14,164,900	15,106,800
Canada	29,963,700	31,877,300	33,677,500	35,420,300	37,119,800
	Numeric Change				
	1996-01	2001-06	2006-11	2011-16	1996-16
Newfoundland	5,643	(11,100)	(15,300)	(17,600)	(38,357)
Prince Edward Island	1,357	3,100	2,500	2,000	8,957
Nova Scotia	9,581	11,300	7,400	4,100	32,381
New Brunswick	5,969	3,300	(100)	(1,100)	8,069
Quebec	338,972	277,200	271,300	215,600	1,103,072
Ontario	1,015,609	946,500	944,400	941,900	3,848,409
Canada	1,913,600	1,800,200	1,742,800	1,699,500	7,156,100
	Annual Percent Change				
	1996-01	2001-06	2006-11	2011-16	1996-16
Newfoundland	0.2%	-0.4%	-0.5%	-0.6%	-0.3%
Prince Edward Island	0.2%	0.4%	0.4%	0.3%	0.3%
Nova Scotia	0.2%	0.2%	0.2%	0.1%	0.2%
New Brunswick	0.2%	0.1%	-0.0%	-0.0%	0.1%
Quebec	0.9%	0.7%	0.7%	0.5%	0.7%
Ontario	1.7%	1.5%	1.4%	1.3%	1.5%
Canada	1.2%	1.1%	1.0%	0.9%	1.1%

NOTE:

[1] "Medium-Growth Scenario", as defined by Statistics Canada.

SOURCE: Statistics Canada, Demography Division, Population Projections Section.

Provincial Population Projections

Population projections for Canada, the Eastern Provinces and individual metropolitan areas were also obtained from Statistics Canada. Provincial-level forecasts are summarized above, for the “medium growth” scenario developed by Statistics Canada. (Slow and high-growth projections were also provided.) The medium growth scenario forecasts Canada’s population to expand at an average annual rate of 1.1% over the 1996 to 2016 period, while the low and high growth scenarios forecast annual growth rates of 0.7% and 1.4%, respectively. (Similar variations apply to individual provinces.) Under the medium growth scenario, Canada’s population is projected to grow by nearly 7.2 million over the 20-year period, with roughly 54% of that growth occurring within Ontario.

As shown in the Table, the forecast calls for a continuation of population losses in Newfoundland over the next 20-years. The remaining Atlantic Provinces are projected to experience relatively nominal growth while Quebec and New Brunswick are projected to grow at annual rates of 0.7% and 1.5%, respectively. Under this medium growth scenario, the populations of Ontario and Quebec will grow faster than most of the Northeastern US over the next two decades. Under Statistics Canada’s more conservative “slow growth” scenario, projected growth rates in Ontario and Quebec are more consistent with the Northeastern US, and the remaining Eastern Provinces are collectively projected to lose population to the Year 2016.

It should also be noted that there was a substantial difference in 1997 provincial-level population estimates provided by Statistics Canada and Standard & Poor’s DRI.⁶ Current population counts in Eastern Canada could therefore be lower than Statistics Canada estimates. However, both sources are consistent regarding the provincial distribution of population growth, particularly the higher growth rates reported for Ontario. These projections reflect the observed concentration of high-technology employment and job growth within Canada’s largest urban areas and the resulting migration of population into those areas.

Economic Trends

Figures II-3 and II-4 illustrate the recent performance of Canada’s economy and the relative contributions made by the Eastern Provinces and the rest of western and northern Canada to the country’s gross domestic product (GDP) in 1996. Canada’s real GDP growth over the past decade is illustrated in Figure II-3. This exhibit shows that the Canadian economy was in recession, much like the U.S., during 1990 and 1991. Canada’s economy slowly

Canadian Real GDP Growth
(1986 Constant \$)

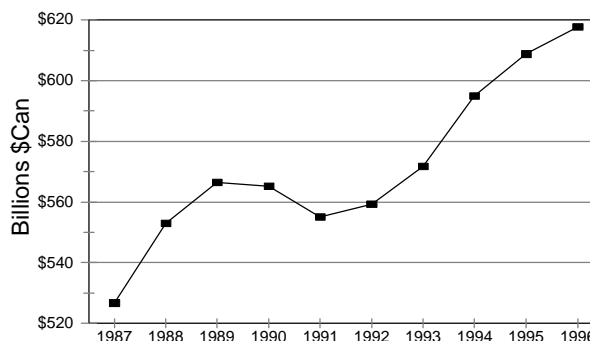


Figure II-3

Source-Statistics Canada, Canadian Economic Observer, October, 1998.

⁶ 1997 population data supplied by Standard & Poor’s DRI, indicated that the six provinces had a combined population of 20.4 million, roughly 840,000 below the totals reported by Statistics Canada. DRI’s 1997 population estimates and 2008 projections are provided in Table II-3.

recovered in 1992 and has exhibited moderate growth since that time.

Figure II-4 compares the relative size of the provincial economies of Eastern Canada. The illustration shows that the four Atlantic Provinces, combined, contributed less than 6% to Canada's GDP of nearly \$798 billion in 1996, while Quebec and Ontario represented 22% and 41%, respectively. The combined GDP of the four Atlantic Provinces in 1996 totaled \$47.7 billion (\$Can), less than 15% of Ontario's GDP of \$323 billion.⁷

Provincial Employment Trends

Employment growth trends from January of 1994 through the first half of 1998 are provided in the following series of graphs for each of the Eastern Provinces.⁸ The graphs illustrate the substantial size differences and variations in recent job growth experienced among the Eastern Provinces since 1994. A brief summary of employment characteristics in each province is also provided.

Distribution of 1996 Canada

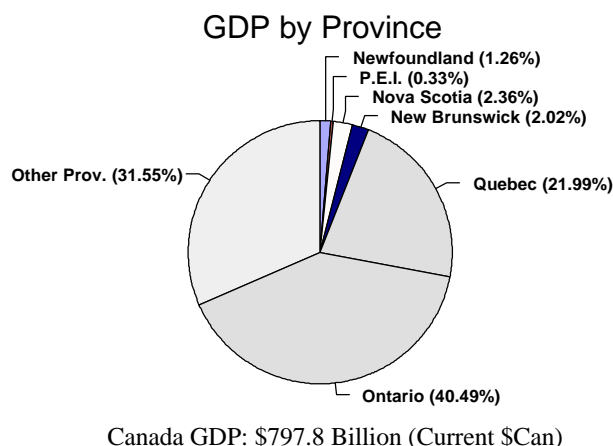


Figure II-4: Source-Statistics Canada, Canadian Economic Observer, October, 1998.

Newfoundland

With an average provincial unemployment rate of 18.8% in 1997, recent economic trends and near-term forecasts for Newfoundland are relatively bleak. The province has not shared in Canada's economic recovery since 1992 and is dominated by slow growth industries. The provincial economy is characterized by a relatively small manufacturing base, which represents less than 9.2% of total employment, and a high concentration of jobs in the

Total Seasonally Adjusted Employment Newfoundland: 1/94-7/98

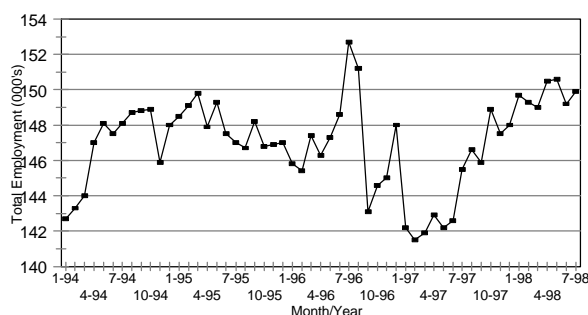


Figure II-5

⁷ To place these figures in context, Maine's 1996 Gross State Product was \$26.05 billion (current \$US). Source: New England Economic Project.

⁸ The graphs report monthly seasonally adjusted payroll employment by place of work. Totals exclude self-employed persons, military personnel and unpaid family workers.

transportation and utilities sectors. The Province has been losing population during the 1990s and that trend is projected to continue over the next decade.

Prince Edward Island

PEI enjoyed a strong economic recovery in 1995-96, but has experienced minimal job growth since that time. As a result, unemployment within the province averaged 14.9% in 1997. Manufacturing is also a relatively small component of PEI's economy, accounting for only 9.5% of total employment in 1997. Nearly 13% of PEI's job base is in "primary" agricultural and fishing industries. Although its total population of 137,000 is by far the smallest among the Atlantic Provinces, PEI has exhibited the fastest rate of recent population growth.

Nova Scotia

Nova Scotia has gained the largest number and maintained the most consistent rate of job growth among the Atlantic Provinces since 1992. A strong service-based economy centered in Halifax has accounted for nearly all of the Province's net job gains in recent years. Manufacturing industries employ 11.5% of the provincial work force and have remained relatively stable over the past two years. Nova Scotia also had the lowest annual average 1997 unemployment rate among the Atlantic Provinces at 12.2%.

Total Seasonally Adjusted Employment
Prince Edward Island: 1/94-7/98

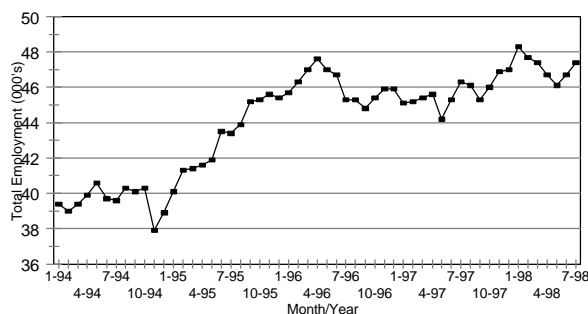


Figure II-6

Total Seasonally Adjusted Employment
Nova Scotia: 1/94-7/98

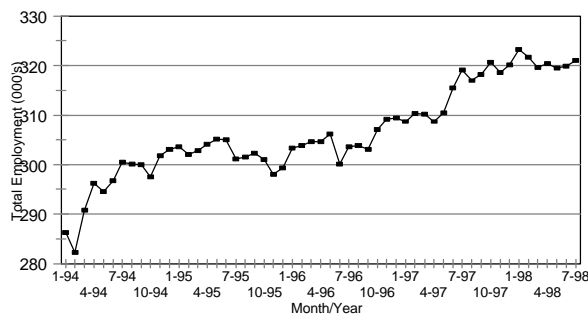


Figure II-7

New Brunswick

After experiencing minimal job growth from 1994 through 1996, the New Brunswick economy added nearly 20,000 payroll jobs during 1997. Payroll jobs then began to decline again during the first half of 1998. New Brunswick has the highest percentage of manufacturing to total employment among the Atlantic Provinces (at 12.5%), but has fewer manufacturing jobs in total than Nova Scotia. Despite its significant job growth in 1997, unemployment still averaged 12.8% for the year.

Quebec

With the exception of a relatively short downturn in 1996, the economy of Quebec Province has steadily added more than 200,000 payroll jobs since 1994. Manufacturing is a larger component of Quebec's economy than any of the Atlantic Provinces, accounting for nearly 19% of total employment in 1997. The number of provincial manufacturing jobs also grew modestly over the past two years. Employment growth in the service sector also averaged more than 3% per year in 1996 and 1997 and accounted for most of the Province's net job growth over that period. Quebec's unemployment rate was slightly lower than the Atlantic Provinces in 1997, averaging 11.4 percent for the year.

Total Seasonally Adjusted Employment New Brunswick: 1/94-7/98

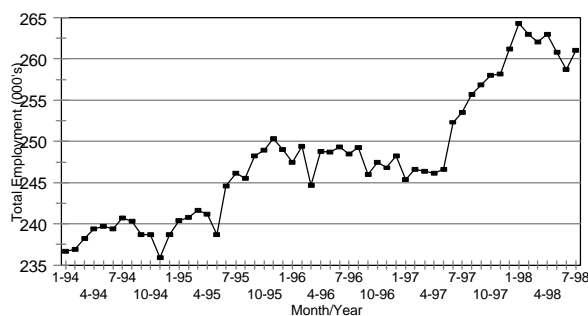


Figure II-8

Total Seasonally Adjusted Employment Province of Quebec: 1/94-7/98

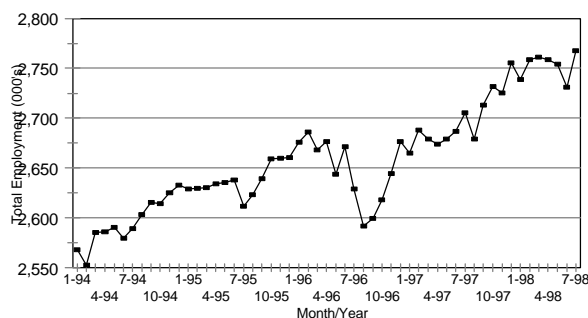


Figure II-9

Ontario

With nearly 4.6 million payroll jobs, employment in Ontario is nearly 30 percent larger than the five remaining Eastern Provinces, combined. Ontario's economy has also added more jobs since 1994 (about 450,000) than the five remaining provinces, combined. Ontario has roughly the same ratio of manufacturing to total employment as Quebec (18.6%), but has experienced more manufacturing job growth in recent years. Ontario's average 1997 unemployment rate, at 8.5 percent, was also the lowest among the Eastern Provinces.

Total Seasonally Adjusted Employment Province of Ontario: 1/94-7/98

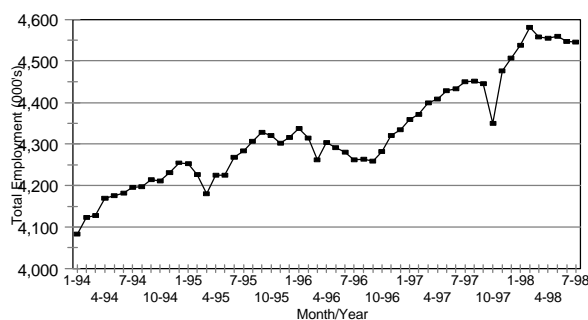
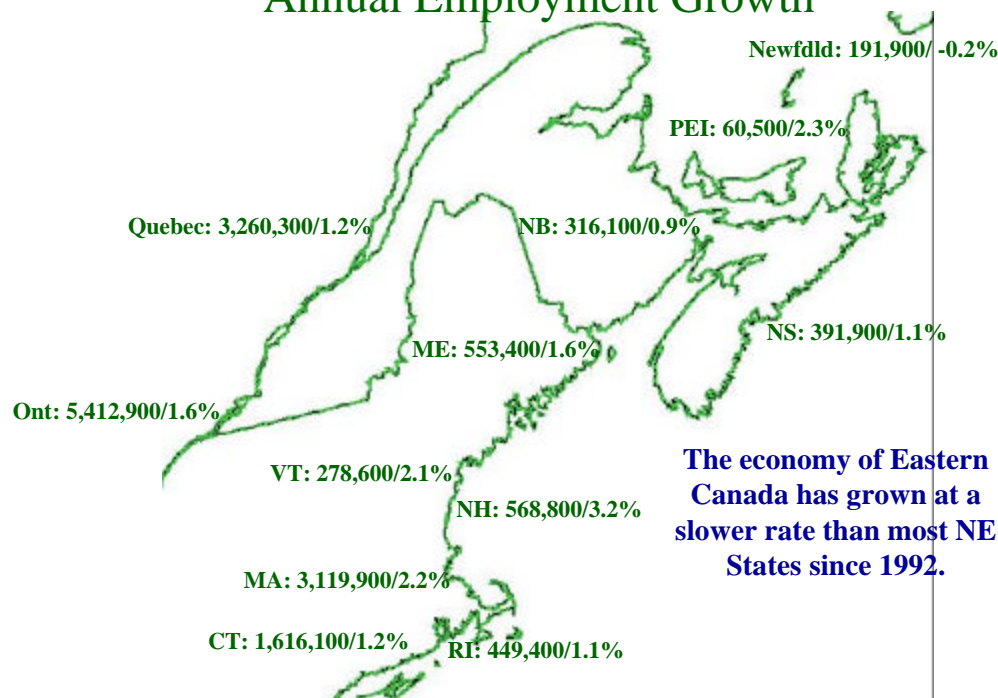


Figure II-10

1997 Employment & 1992-97 Annual Employment Growth



Map II-2

The comparative size and recent rates of job growth in the six Eastern Provinces are compared with the New England States in Map II-2. Employment totals shown on the Map include both payroll workers and other categories of self-employed workers and military employment, which were not counted in the preceding graphs. As indicated on the Map, Quebec's economy is roughly the size of Massachusetts', while Ontario's economy is larger than those of Massachusetts, Connecticut and Rhode Island,

combined. Collectively, the four Atlantic Provinces had a total employment base of 960,000 in 1997. This total was roughly 14% lower than the number of jobs in Maine and New Hampshire combined. Maine's economy has also grown at a faster rate than Atlantic Canada (with the exception of PEI) since 1992.

Economic Outlook

A 10-year economic forecast for Canada's Provinces and Census Metropolitan Areas was obtained for this analysis from Standard & Poor's DRI. A summary of the forecast results for the six Eastern Provinces profiled above, appears in Table II-6. More detailed tables are also provided in the Appendix. The reader should note that the employment estimates contained in the following table include payroll and non-payroll workers. The starting (1997) population estimates used in DRI's forecast are also lower than those provided by Statistics Canada, which were presented previously.

The forecast in Table II-6 is consistent with the general discussion of Canada's economic outlook, which was summarized above. The forecast calls for continued population and job losses in Newfoundland over the next decade. The remaining Atlantic Provinces are projected to achieve a very modest expansion of less than 65,000 jobs (8.5%) by 2008, with more than 60% of that projected job growth occurring in Nova Scotia. The remaining Atlantic Provinces are also expected to experience minimal net gains in population and households over the period. Average household income is projected to grow at a 3 percent annual rate, roughly a percentage point above Canada's expected average rate of inflation. Growth prospects for the Province of New Brunswick are particularly low, with less than 19,000 jobs and essentially zero population growth anticipated through 2008.

The economic growth forecasts for Ontario and Quebec are more favorable than those for the Atlantic Provinces and are somewhat comparable to the New England States. The Quebec economy is projected to add 350,000 jobs over the coming decade. In addition, Québec's population is expected to grow at a rate of 0.4% per year, expanding by more than 292,000 and creating more than 274,000 households by 2008. Because most of these new jobs are expected to be created in Montreal and surrounding metropolitan areas located in the southwest corner of the province, much of Quebec's growing population and employment centers could be accessible to an east-west highway through Maine.

Projected job growth in Ontario reflects the expected expansion of Canada's high-technology manufacturing and service industries located in and near Metropolitan Toronto. Annual job growth is forecast at a moderate 1.8% annual rate through 2008, which is projected to create more than 1.1 million jobs by the end of the forecast. Population and households are projected to grow at corresponding rates of 1.1% and 1.5% per year, respectively. This growth is expected to be supported in part by out-migrants from the Atlantic Provinces. Average household income levels in Ontario are also projected to rise by 3.5% per year, nearly twice the projected rate of Canadian inflation. The current (1997) estimated average household income for Ontario, at nearly \$70,000, is also higher than the other Eastern Provinces and well above the national average.

Table II-6
Summary Economic Outlook: 1997-2008
Eastern Canadian Provinces

Indicator	Newfound- land	New Brunswick	Nova Scotia	PEI	Quebec	Ontario
Total Employment: (1997)	191,900	316,100	391,900	60,500	3,260,300	5,412,900
Total Employment: (2008)	184,057	334,951	430,992	67,371	3,613,309	6,556,680
Projected Employment Change: (97-08)	(7,843)	18,851	39,092	6,871	353,009	1,143,780
Annual Employment Growth: (97-08)	-0.4%	0.5%	0.9%	1.0%	0.9%	1.8%
Population: (1997)	545,006	738,995	913,801	135,736	7,174,387	10,905,068
Population: (2008)	475,689	740,284	952,453	147,411	7,466,513	12,350,488
Projected Population Change: (97-08)	(69,317)	1,289	38,659	11,675	292,126	1,445,420
Annual Population Growth: (97-08)	-1.2%	0.0%	0.4%	0.8%	0.4%	1.1%
Households: (1997)	188,105	275,453	348,524	49,300	2,878,467	4,022,881
Households: (2008)	191,453	297,122	384,865	56,332	3,152,588	4,752,700
Projected Household Change: (97-08)	3,348	21,669	36,341	7,032	274,121	729,819
Annual H'hold Growth: (97-08)	0.2%	0.7%	0.9%	1.2%	0.8%	1.5%
Average Household Income 1997: [1]	\$51,918	\$53,657	\$52,863	\$52,110	\$54,777	\$69,772
Average Household Income 2008: [1]	\$65,314	\$73,173	\$74,183	\$73,347	\$77,657	\$101,650
Annual Household Income Growth: (97-08)	2.1%	2.9%	3.1%	3.2%	3.2%	3.5%
Average Annual Housing Starts: (97-08)	868	2,116	3,718	639	25,624	65,806

NOTE:

[1] Household income estimates and projections are in Current Canadian Dollars.

SOURCE: Standard & Poor's DRI Canadian Market Outlook: Metro Focus Summer 1998.

Sub-Provincial Markets

Sub-provincial demographic and employment data are collected in Canada for "Census Agglomerations" (CAs) and "Census Metropolitan Areas" (CMAs). Census Agglomerations are economically grouped Census Divisions (the Canadian equivalent of U.S. counties) which are used to identify non-metropolitan labor markets. The CMA is the regional geography which is used to define Canada's major metropolitan areas and largest urban labor markets. The criteria used to define Canadian CMAs are similar their US equivalents, Metropolitan Statistical Areas.

Numerous Census Agglomerations have been designated throughout Eastern Canada. However, a minimal amount of current statistical information is collected for these smaller areas. Three CAs, Fredericton, Moncton and Edmundston-Woodstock, are important to this analysis because of their proximity and highway connections to Maine. Employment (1992 to 1997 trends) and corresponding population counts are provided below for those CAs which might be influenced by an east-west highway corridor through Maine. No forecast data was available for these non-metropolitan areas.

Map II-3
Locations of Major Eastern Canada CMAs

Map II-3 will be posted to the document when available.

There are 25 Census Metropolitan Areas in Canada, with an estimated combined 1997 population of 18.7 million. Of these, 14 CMAs are located near the U.S. border along the northern shores of the Great Lakes and south of the Saint Lawrence Seaway, between Windsor, near Detroit Michigan, and Halifax, Nova Scotia. These CMAs contain the majority of Eastern Canada's population and job base and are directly serviced by the Trans-Canada Highway. These 18 sub-provincial regions are highlighted in the following tables because of their proximity to Maine and potential to be served by an east-west highway through the State. An additional CMA, St. John's Newfoundland, is also included in the analysis because it is one of only three metropolitan areas located in the Atlantic Provinces.

Economic and demographic trend and forecast data for these CMAs were obtained from Statistics Canada and Standard & Poor's DRI. The following summary tables include current employment and population estimates, along with forecasts to 2008. Additional detailed tables are contained in the Appendix.

Employment Trends

Recent (1992 to 1997) employment trends within the larger population centers of the Atlantic Provinces, Southern Quebec and Ontario are presented in Table II-7. The time series covers a period of economic recovery, following a recession during 1990-91. All but one of the areas identified (Saint John, New Brunswick) experienced net job gains during this period. Of the 18 CAs and CMAs listed in the table, 13 equaled or out-performed their respective provinces in terms of the annual rate of job growth over the five years. Summary trends for those major markets located within the Atlantic Provinces, Quebec and Ontario are provided below.

Atlantic Provinces

Within the Atlantic Provinces, Halifax is by far the dominant employment center. Total 1997 employment in the Halifax CMA accounted for nearly 18% of the combined employment of the four provinces. In addition, Halifax captured more than 67% of Nova Scotia's net job gains and 36% of the net job gains recorded throughout the Atlantic Provinces from 1992 through 1997. Annual job growth in Halifax averaged 1.7% over the period, exceeding 14 of the 18 regions profiled in Table II-7.

Among the other markets identified in the table, St. John's added jobs at a 1.4% annual rate from 1992 to 1997, while Newfoundland as a whole lost employment. In New Brunswick, the economies of the larger population centers performed more poorly than the Province as a whole, running counter to national trends. Saint John was in fact the only CMA which lost employment over this period, while Fredericton and Moncton under-performed New Brunswick's 0.9% annual rate of job growth. The relatively rural Edmundston-Woodstock area, which borders Aroostook County, in fact added more jobs in total than Fredericton, Moncton or Saint John. This observation suggests that the economies of New Brunswick's largest population centers lack growth industries and are structurally weaker than the province as a whole.

Table II-7**Total Employment Trends: 1992-1997****Selected Canadian Census Metropolitan Areas, Census Agglomerations and Economic Regions**

and Economic Regions

TOTAL EMPLOYMENT [1]	1992	1997	Change: 1992-1997		Annual Rate
			Number	Percent	
Atlantic Provinces					
St. John's, Newfoundland	74,400	79,800	5,400	7.3%	1.4%
Halifax, N.S.	155,800	169,700	13,900	8.9%	1.7%
Saint John N.B.	59,500	57,100	(2,400)	-4.0%	-0.8%
Moncton, N.B. [2]	77,900	80,400	2,500	3.2%	0.6%
Fredericton-Oromocto, N.B. [2]	54,700	55,500	800	1.5%	0.3%
Edmundston-Woodstock, N.B. [2]	32,400	35,200	2,800	8.6%	1.7%
Quebec Province					
Quebec City	310,200	319,400	9,200	3.0%	0.6%
Trois-Rivières	58,200	61,000	2,800	4.8%	0.9%
Sherbrooke	61,200	65,600	4,400	7.2%	1.4%
Montreal	1,492,700	1,590,600	97,900	6.6%	1.3%
Ontario					
Ottawa-Hull [3]	497,800	531,800	34,000	6.8%	1.3%
Oshawa	118,800	136,000	17,200	14.5%	2.7%
Toronto	2,020,800	2,246,500	225,700	11.2%	2.1%
Hamilton	295,300	315,200	19,900	6.7%	1.3%
St. Catharines - Niagara	153,000	161,900	8,900	5.8%	1.1%
London	198,200	210,400	12,200	6.2%	1.2%
Windsor	119,100	133,900	14,800	12.4%	2.4%
Kitchener - Waterloo	194,300	204,900	10,600	5.5%	1.1%

NOTES:

- [1] Figures represent the total employed labor force (age 15+) by place of residence, including payroll workers and the self-employed.
- [2] Denotes a Census Agglomeration or Economic Region. All other geographies are Census Metropolitan Areas (CMAs)
- [3] A portion of the Ottawa-Hull CMA is located in Quebec Province.

SOURCE: Statistics Canada, from the Labour Force Survey.

Quebec

Similar to the Atlantic Provinces, Quebec's economy is dominated by a single CMA. Montreal's employment base of nearly 1.6 million represented nearly 49% of total provincial employment in 1997. With a 1.3% annual rate of job growth, Montreal also captured nearly 51% of Quebec's total employment gains over the period. The province's other major metropolitan area, Quebec City, is only one-fifth the size of Montreal in terms of employment. Employment in Quebec City also grew at less than half the rate of Montreal over the period and under-performed the province as a whole. Much of the cause of this slow job growth in the Quebec CMA can be attributed to the downsizing of the provincial government during the early 1990's.

The two remaining Quebec CMAs shown in the table, Sherbrooke and Trois-Rivières, have natural resource-based economies that are structurally similar to Northern Maine. Located roughly 60 miles from Coburn Gore, Sherbrooke lies a similar distance from Maine's borders as Saint John, New Brunswick. With a total job base of more than 65,000, Sherbrooke is also larger than Saint John and gained more jobs (4,400 in total) from 1992 to 1997.

Ontario

Consistent with the discussion of provincial growth trends presented above, nearly all of the CMAs located in Southern Ontario grew faster than those in the Atlantic Provinces and Quebec from 1992 to 1997. The Toronto CMA alone added 225,700 jobs, more than all of the Atlantic Provinces and Quebec combined. Toronto's 2.1% annual employment growth also exceeded most of the major metropolitan areas in the Northeastern U.S. over this same period. The other Ontario CMAs listed in the table added jobs at comparable rates ranging from 1.1% to 2.7% per year.

Population and Employment Forecasts

The 10-year economic outlook for the 15 CMAs included in Table II-7 was also forecast by Standard & Poor's DRI and is summarized below.⁹ More detailed tables containing selected annual demographic and employment by industry trends and projections from 1995 to 2008, are also included in the appendix. Summary highlights for each CMA are provided below:

Halifax, Nova Scotia

- Halifax is the economic center of Atlantic Canada, with above average employment in the financial, trade and business services sectors;
- less than 6.5% of total employment is in manufacturing;
- more than 43% of Nova Scotia's employed population lives in the Halifax CMA;
- average household income is near the national average;
- 7.1% unemployment rate is lowest in the Atlantic Provinces and below the national average;
- annual job growth was also above the national average.

Saint John, New Brunswick

- Saint John is New Brunswick's largest city with a population of nearly 126,000, but is the second smallest among all of Canada's CMAs;
- Saint John's economy is oriented toward transportation, warehousing & distribution, communications, utilities, retail & wholesale trade;
- manufacturing accounts for 12.1% of total employment;
- the CMA has an aging population base with one of the lowest labor force participation rates in Canada (62%);
- younger workers are out-migrating;

- the CMA's average household income of \$56,000 is 11% below the national average;
- economic prospects are less favorable than either Fredericton and Moncton.

St. John's, Newfoundland

- St. John's is Newfoundland's center for warehousing & distribution, shipping, mining & electric power generation, the CMA economy is oriented to slow growth industries;
- St. John's has more than twice as many governmental employees than the average of Canada's 25 CMAs;
- The CMA has a very small manufacturing base accounts for only 6% of total employment;
- population base and labor force participation rates are shrinking;
- despite St. John's high rate of unemployment, personal income per household ranks 16th among CMAs and is just below the national average.

⁹ Comparable data for the smaller Census Agglomerations was not available.

Table II-8
Summary Economic Outlook: 1998-2008
Atlantic Province Census Metropolitan Areas

Indicator	Halifax NS	Saint John, NB	St. John's Newfoundland
Total Employment: (1997)	169,700	57,100	79,800
Total Employment: (2008)	203,726	62,249	80,974
Projected Employment Change: (97-08)	34,026	5,149	1,174
Annual Average Job Growth: (97-08)	1.7%	0.8%	0.1%
1997 Average Unemployment Rate: (%)	9.1	12.7	13.8
Estimated Current Population: (1997)	337,111	125,999	173,373
Projected Population: (2008)	375,868	126,732	165,444
Annual Population Growth: (97-08)	1.0%	0.1%	-0.4%
Estimated Current Households: (1997)	131,090	47,771	61,827
Projected Households: (2008)	153,527	51,523	66,582
Annual Household Growth: (97-08)	1.4%	0.7%	0.7%
Average Household Income: 1997[1]	\$61,761	\$55,965	\$61,124
Average Household Income: 2008[1]	\$89,247	\$74,081	\$77,458
Annual H'hold Income Growth (97-08)	3.4%	2.6%	2.2%
Average Annual Housing Starts: (97-08)	2,210	302	480

NOTE:

[1] Income estimates and projections are in current Canadian Dollars.

SOURCE: Standard & Poor's DRI Canadian Market Outlook: Metro Focus Summer 1998.

Table II-9
Summary Economic Outlook: 1998-2008
Selected Quebec Census Metropolitan Areas

Indicator	Montreal	Quebec City	Sher- brooke	Trois- Rivieres
Total Employment: (1997)	1,590,600	319,400	65,600	61,000
Total Employment: (2008)	1,764,391	350,204	73,419	64,037
Projected Employment Change: (97-08)	173,791	30,804	7,819	3,037
Annual Average Job Growth: (97-08)	0.9%	0.8%	1.0%	0.4%
1997 Average Unemployment Rate: (%)	10.9	10.5	11.8	14.2
Estimated Current Population: (1997)	3,353,874	676,402	148,760	140,441
Projected Population: (2008)	3,581,110	716,473	159,351	143,763
Annual Population Growth: (97-08)	0.6%	0.5%	0.6%	0.2%
Estimated Current Households: (1997)	1,368,220	282,942	63,382	59,437
Projected Households: (2008)	1,520,823	312,885	70,631	63,646
Annual Household Growth: (97-08)	1.0%	0.9%	1.0%	0.6%
Average Household Income: 1997[1]	\$57,445	\$56,807	\$51,043	\$49,770
Average Household Income: 2008[1]	\$79,399	\$80,056	\$72,954	\$69,103
Annual H'hold Income Growth (97-08)	3.0%	3.2%	3.3%	3.0%
Average Annual Housing Starts: (97-08)	9,226	2,250	748	404

NOTE:

[1] Income estimates and projections are in current Canadian Dollars.

SOURCE: Standard & Poor's DRI Canadian Market Outlook: Metro Focus Summer 1998.

Montreal, Quebec

- The Montreal CMA has been experiencing rapid job growth in information technology and other high-tech industry sectors;
- at the same time, large job losses are occurring in other industries, causing slow overall employment growth & high unemployment;
- because the economy is undergoing major structural change, income disparities within the local population are deepening;
- despite the loss of traditional industries, manufacturing still represents 19.4% of total employment;
- Montreal's high cost, high tax, highly-regulated business climate has caused some businesses to out-migrate to lower-cost markets;
- political uncertainty is also limiting near term growth prospects.

Quebec City, Quebec

- The Quebec CMA has a strong employment base in finance, insurance, retail trade and services;
- manufacturing industries employ fewer than 30,000 workers;
- public-sector jobs account for 12.5% of total employment;
- although its economic base has insulated the City from past cyclical downturns, reduced government spending is expected to limit job growth in the near term;
- future growth prospects could be impacted by the eventual resolution of the Separatist issue.

Sherbrooke, Quebec

- Sherbrooke's economy is somewhat similar to Northern Maine, with an above average concentration of employment in pulp & paper products and food processing industries;
- nearly 22% of total employment is in manufacturing;
- the CMA economy is under-

represented in services and retail trade;

- average household income is 20% below the national average;
- an out-migration of younger workers has lowered labor force participation to 61%, among the lowest in Canada;
- the area has a higher concentration of English-speaking population than most of Quebec.

Trois Rivières, Quebec

- Trois Rivières is located between Quebec City and Montreal and is the smallest CMA in the province;
- the CMA's economic base is similar to that of Sherbrooke, with a high concentration of paper & pulp manufacturing;
- the area suffers from chronic unemployment and has historically had one of the highest unemployment rates in among all of Canada's CMAs;
- the area's average household income, below \$50,000, and 60% labor force participation rate are also last among all CMAs.

Table II-10
Summary Economic Outlook: 1998-2008
Selected Southern Ontario Census Metropolitan Areas

Indicator	Toronto	Ottawa-Hull	Hamilton	London	Kitchener	St. Cath. Niagara	Oshawa	Windsor
Total Employment: (1997)	2,246,500	531,800	315,200	210,400	204,900	161,900	136,000	133,900
Total Employment: (2008)	2,752,453	660,596	358,529	235,440	245,929	183,989	180,526	155,884
Projected Employment Change: (97-08)	505,953	128,796	43,329	25,040	41,029	22,089	44,526	21,984
Annual Average Job Growth: (97-08)	1.9%	2.0%	1.2%	1.0%	1.7%	1.2%	2.6%	1.4%
1997 Average Unemployment Rate: (%)	8.0	9.0	6.5	7.7	7.4	9.9	8.2	9.2
Estimated Current Population: (1997)	4,347,239	1,025,892	630,079	402,405	389,028	374,282	275,302	281,942
Projected Population: (2008)	5,122,874	1,175,202	681,667	437,680	444,482	390,268	336,197	315,158
Annual Population Growth: (97-08)	1.5%	1.2%	0.7%	0.8%	1.2%	0.4%	1.8%	1.0%
Estimated Current Households: (1997)	1,530,267	396,468	239,335	159,833	144,739	146,885	96,492	108,568
Projected Households: (2008)	1,878,795	474,113	268,734	180,485	174,026	158,359	124,642	126,233
Annual Household Growth: (97-08)	1.9%	1.6%	1.1%	1.1%	1.7%	0.7%	2.4%	1.4%
Average Household Income: 1997[1]	\$80,407	\$69,515	\$66,989	\$64,580	\$69,344	\$59,718	\$77,092	\$62,951
Average Household Income: 2008[1]	\$118,167	\$101,436	\$94,830	\$89,316	\$99,879	\$84,124	\$114,538	\$90,575
Annual H'hold Income Growth (97-08)	3.6%	3.5%	3.2%	3.0%	3.4%	3.2%	3.7%	3.4%
Average Annual Housing Starts: (97-08)	31,359	5,648	3,601	1,854	2,803	1,039	2,578	2,848

NOTE:

[1] Income estimates and projections are in current Canadian Dollars.

SOURCE: Standard & Poor's DRI Canadian Market Outlook: Metro Focus Summer 1998

Toronto, Ontario

- Toronto is Canada's most populated CMA with a total population of nearly 4.4 million;
- Toronto has the highest average household income among all CMAs, 28% above the national average;
- nearly 445,000 manufacturing jobs are located in the region, including a large concentration of high-tech and core information-technology (IT) industries;
- Toronto has strong financial and business service sectors and has the lowest unemployment rate in Eastern Canada;
- the dominant CMA within the "Golden Horseshoe", a region located along the southwest shore of Lake Ontario opposite Buffalo, New York, which has created 300,000 jobs over the past decade;
- the Golden Horseshoe, has a combined population of nearly 6.4 million, (22% of Canada's total population) and is projected to grow by nearly 1.0 million over the next ten years;
- the region's strong growth is expected to attract in-migrants from other provinces (and nations).

Ottawa-Hull, Ontario-Quebec

- Canada's Capital and fourth largest CMA with a population of 1.0 million;
- located midway between Montreal and Toronto, Ottawa-Hull is the only CMA to cross provincial borders;
- the area is noted as having the highest concentration of IT employment and the most skilled labor force among all CMAs;
- as a result, average household income and the labor force participation rate are well above the national average.

Hamilton, Ontario

- A center for heavy-manufacturing in Ontario, located on the western shore of Lake Ontario between Toronto and Buffalo, New York;
- economic restructuring to meet

international competition caused the area's manufacturing sector to downsize over the past decade, but job gains in other sectors have more than offset those losses;

- because the region's manufacturing industries have restructured to become more competitive, job growth over the next decade is projected to occur at double the rate of the 1990s.

London, Ontario

- This CMA has a balanced, diversified economy that is very close to in composition to the average of all of Canada's CMAs;
- located roughly midway between Toronto and Detroit, London has become a shopping and entertainment destination for much of southwestern Ontario;
- unemployment, job growth and personal income levels are all near the national average.

Kitchener, Ontario

- Located west of Toronto, Kitchener has a strong high-tech manufacturing sector that works closely with the region's nearby education and research institutions;
- noted as an economic development success story and one of Canada's fastest growing CMAs;
- manufacturing accounted for nearly 28.5% of total employment in 1997, one of the highest ratios among all CMAs.

St. Catharines-Niagara, Ontario

- Strategically located between Lake Erie and Ontario, opposite Buffalo, New York, St. Catharines-Niagara is situated near the US border point which carries a major share of truck-transported trade between Canada and the US;
- a service center for an active agricultural region, tourism destination and popular retirement area;
- the CMA still maintains a large

- manufacturing base which accounts for 21% of total employment;
- traditional industries were hard hit during 1990-91 and have grown more slowly than other regions.

Oshawa, Ontario

- Located just east of Toronto at the eastern end of the Golden Horseshoe, this CMA is rapidly being absorbed into the economy of the Toronto, CMA;
- a relatively small population of roughly 275,000, this CMA has more manufacturing jobs (30,000+) than Quebec City and is the center of General Motors' Canadian production;
- Oshawa's population is projected to be the fastest growing among all CMAs (at 2% per year) over the next decade, due mainly to the area's proximity to Toronto;
- the Oshawa CMA has the highest average household income (at \$77,000) among all of Canada's CMAs, 23% above the national average.

Windsor, Ontario

- Located east of Detroit in the southwest corner of the province, Windsor's economy is heavily identified with the automotive industry, many of its residents actually work in the US;
- 27% of total CMA employment is in manufacturing and half of all manufacturing jobs are in the transportation equipment industry;
- recent economic growth has been tied to the recovery of the US auto industry;
- the region also has a rapidly growing wholesale trade sector as a result of expanding US-Canada trade, and is growing as a shopping and entertainment destination as a result of the recent introduction of casino gambling.

Non-Metropolitan Area Population Trends

Comparable economic and demographic forecast information for Canada's non-metropolitan areas are not maintained to the same level of detail as reported above for CMAs. However, current population estimates for a number of other locations in the Atlantic Provinces, Quebec and Ontario were obtained and are listed in Table II-11. The Census Divisions (counties) identified in the Table were selected because of their size and proximity to Maine or to the Trans-Canada highway.¹⁰ These non-metropolitan counties could therefore generate potential travel demand for an east-west highway through Maine.

The table indicates that most of the identified locations nearest to Maine's borders tend to have small populations and have either been stable or losing residents since 1992. With the exception of the Moncton area, which has been growing at a 1% annual rate since 1992, recent population growth in most of the non-metropolitan areas within the Atlantic Provinces has been slower than comparable areas of Quebec and Ontario. Locations between the Maine border and Quebec City have generally exhibited slower population growth rates than those locations which are nearer to Montreal. Most of the non-metro counties located within southern Ontario also tend to be growing faster than those located in Quebec.

¹⁰ Numerous additional Census Divisions which were either very rural or geographically remote from Maine were omitted from this table.

Table II-11
1992 and 1997 Population Estimates
Selected Canadian Non-Metropolitan Census Divisions (Counties)

Census Division or County	Total Population		Change: 1992-1997		Annual
Major City/Town in ()	1992	1997	Number	Percent	Rate
Atlantic Provinces					
Queens (Charlottetown), PEI	68,570	71,576	3,006	4.4%	0.9%
Cape Breton (Sydney), NS	122,686	121,347	(1,339)	-1.1%	-0.2%
Pictou (New Glasgow), NS	50,618	50,350	(268)	-0.5%	-0.1%
Colchester (Truro), NS	49,204	51,144	1,940	3.9%	0.8%
Yarmouth, NS	28,441	28,461	20	0.1%	0.0%
Cumberland (Amherst), NS	34,881	35,245	364	1.0%	0.2%
Charlotte (St. Stephen), NB	27,816	28,534	718	2.6%	0.5%
Carleton (Woodstock), NB	27,897	27,744	(153)	-0.5%	-0.1%
Madawaska (Edmundston), NB	37,780	37,187	(593)	-1.6%	-0.3%
York (Fredericton), NB	86,216	89,552	3,336	3.9%	0.8%
Kings (Sussex), NB	65,334	66,887	1,553	2.4%	0.5%
Westmoreland (Moncton), NB	119,511	125,525	6,014	5.0%	1.0%
Quebec					
Drummond (Drummondville)	82,964	86,934	3,970	4.8%	0.9%
La-Haute-Yamaska (Granby)	76,438	79,377	2,939	3.8%	0.8%
Memphremagog (Magog)	37,282	40,038	2,756	7.4%	1.4%
Beauce-Sartigan (St.-Georges)	45,377	47,791	2,414	5.3%	1.0%
Le Granit (Lac Megantic)	21,465	21,945	480	2.2%	0.4%
Les Maskoutains (St.-Hyacinthe)	79,578	80,372	794	1.0%	0.2%
Le Haut-Richelieu (Saint-Jean-sur-Richelieu)	96,762	102,511	5,749	5.9%	1.2%
L'Amiante (Thetford Mines)	46,954	45,094	(1,860)	-4.0%	-0.8%
Arthabaska (Victoriaville)	62,507	64,613	2,106	3.4%	0.7%
Ontario					
Stomont, Dundas & Glengarry (Cornwall)	114,091	117,605	3,514	3.1%	0.6%
Leeds and Grenville (Brockville)	95,274	100,914	5,640	5.9%	1.2%
Frontenac (Kingston)	135,267	139,824	4,557	3.4%	0.7%
Hastings (Belleville)	123,870	130,538	6,668	5.4%	1.1%
Peterborough	125,385	129,953	4,568	3.6%	0.7%
Northumberland (Port Hope)	82,212	85,252	3,040	3.7%	0.7%
Brant (Brantford)	120,825	125,733	4,908	4.1%	0.8%
Oxford (Woodstock)	97,799	103,411	5,612	5.7%	1.1%
Kent (Chatham)	114,517	116,186	1,669	1.5%	0.3%

Source: Statistics Canada, Annual Demographic Statistics, 1997.

Northeast US Market Overview

Introduction

The following section contains a presentation of population and employment trend and forecast data for those Northeast US States and Metropolitan Areas which are most likely to generate user demand for an east-west highway through the State of Maine. The states and metropolitan areas included in this section were selected because of their proximity to the US/Canadian border, or to major transportation routes which either connect to Maine or could be connected via an east-west highway. In addition, these states and metropolitan areas tend to be the origins or destinations of significant commodity movements to and from Canada.

Information presented in this section includes state-level population and employment trend data and forecasts (1969 to 2045) supplied by the U.S. Department of Commerce, Bureau of Economic Analysis. Population and employment trend data (1969 to 1997) for US metropolitan areas were also obtained from the same source. Although comparable

long range forecasts were not available for metropolitan areas, short-range forecasts for selected metro areas were obtained from Standard & Poor's DRI and are presented in the Appendix.

State-Level Trends/Forecasts

Population and employment trends and forecasts for Maine and 12 other Northeastern US States were obtained by the U.S. Department of Commerce, Bureau of Economic Analysis (BEA). The source provided annual measurements of employment by industry, population and Gross State Product from 1969 to the present, as well as forecasts to the year 2045. A summary of this information appears in Table II-12. Included in the Table are the 6 New England States, New York, New Jersey and Pennsylvania, and the mid-west border States of Ohio, Indiana, Michigan and Illinois.

Population

In total, Maine's population is expected to grow by 71,000 from 1990 to 2000 and 275,000 (21.5%) between 2000 and 2025. BEA also forecasts that Maine's population will grow at a slightly faster annual rate from 2000 to 2015 than it did during the 1990s, when Maine was impacted by both a severe recession and the closure of Loring Air Force Base. The 0.6% rate of annual population growth in Maine during the 1990s is in the middle of the range of the other northeastern states, while the 0.8% annual growth rate forecast from 2000 to 2015 is higher than most of the Northeast.

Annual rates of population growth for other northeast states are expected to range from 0.3% to 0.9% over the current decade. Southern New England and Pennsylvania are projected to have higher rates of population growth from 2000 to 2015 compared to the 1990s, while the remaining northeastern states are all projected to have similar or slower growth rates in the future. In percentage terms, the outlook for the population growth in much of the Northeast US is slower than Ontario and comparable to Quebec.

Employment

Growth in total employment among northeastern U.S. States during the 1990s shows significantly more volatility than population, due to the varying impacts and rates of recovery from the recession of 1990-91. The Midwest US and Northern New England States have exhibited the fastest rates of job growth during the 1990s, ranging from 0.8% to 1.4% annually, while Connecticut, Rhode Island and New York have had the slowest job growth (0.2% to 0.5% per year).

According to BEA's forecasts, the Northeastern States are projected to maintain modest annual growth rates in total employment of between 0.5% to 1.0% from 2000 to 2015. Employment growth for the New England States is projected between 0.8% and 1.0% annually. Future job growth in New York and New Jersey is projected to accelerate slightly in comparison to the past decade, while Ohio, Indiana, Michigan, Illinois and Pennsylvania are projected to experience a slowdown in job growth. BEA's longer range employment outlook (2015 to 2025) calls for job growth to slow throughout the Northeast, to annual rates of 0.4% or less.

The BEA's 2000-2015 population (0.8%) and employment (0.9%) growth rates forecast for Maine are very similar to a recently released 1997 to 2010 forecast released by the Maine State Planning Office. The MSPO forecast calls for a 1.0% annual rate of job growth to 2010, consistent with the longer-range BEA forecast, but a slower 0.6% rate of population growth.

Table II-12
Population and Employment Trends and Projections [1]
Maine and Northeast U.S. States

	1990	1998	Total Change			Annual Growth Rate		
	History	Estimate	1990-00	2000-15	2015-25	1990-00	2000-15	2015-25
Total Population								
Maine	1,231,000	1,280,000	71,000	160,000	115,000	0.6%	0.8%	0.8%
New Hampshire	1,112,000	1,191,000	106,000	177,000	116,000	0.9%	0.9%	0.8%
Vermont	565,000	605,000	54,000	85,000	55,000	0.9%	0.9%	0.8%
Massachusetts	6,018,000	6,219,000	283,000	720,000	529,000	0.5%	0.7%	0.7%
Connecticut	3,289,000	3,378,000	145,000	420,000	306,000	0.4%	0.8%	0.8%
Rhode Island	1,005,000	1,021,000	32,000	112,000	91,000	0.3%	0.7%	0.8%
New York	18,002,000	18,358,000	470,000	751,000	747,000	0.3%	0.3%	0.4%
New Jersey	7,740,000	8,182,000	594,000	952,000	674,000	0.7%	0.7%	0.7%
Illinois	11,448,000	12,087,000	812,000	1,296,000	919,000	0.7%	0.7%	0.7%
Indiana	5,555,000	5,890,000	407,000	578,000	453,000	0.7%	0.6%	0.7%
Michigan	9,311,000	9,656,000	430,000	682,000	603,000	0.5%	0.5%	0.6%
Ohio	10,862,000	11,353,000	570,000	868,000	750,000	0.5%	0.5%	0.6%
Pennsylvania	11,896,000	12,277,000	517,000	1,002,000	904,000	0.4%	0.5%	0.7%

TOTAL Employment								
Maine	696,500	731,500	57,000	108,100	25,500	0.8%	0.9%	0.3%
New Hampshire	638,100	694,500	78,800	118,800	32,100	1.2%	1.0%	0.4%
Vermont	339,500	374,200	46,600	60,400	14,800	1.3%	1.0%	0.3%
Massachusetts	3,612,400	3,749,900	235,400	541,300	129,500	0.6%	0.9%	0.3%
Connecticut	1,996,100	2,029,800	94,000	310,600	79,000	0.5%	0.9%	0.3%
Rhode Island	551,000	564,600	27,800	73,500	16,600	0.5%	0.8%	0.3%
New York	9,855,000	9,874,300	196,300	797,100	30,700	0.2%	0.5%	0.0%
New Jersey	4,339,900	4,513,700	301,600	630,700	127,400	0.7%	0.9%	0.2%
Illinois	6,425,600	6,970,900	721,700	941,100	192,900	1.1%	0.8%	0.2%
Indiana	3,065,000	3,462,000	471,800	430,500	89,200	1.4%	0.8%	0.2%
Michigan	4,756,000	5,152,600	468,400	514,100	87,200	0.9%	0.6%	0.2%
Ohio	5,892,900	6,428,700	639,600	696,300	109,500	1.0%	0.7%	0.2%
Pennsylvania	6,301,000	6,674,400	506,600	700,400	106,800	0.8%	0.7%	0.1%

NOTE:

[1] Employment totals include all categories of workers, including military personnel, agricultural workers and the self-employed.

Source: U.S. Department of Commerce, Bureau of Economic Analysis

Table II-13
Employment Trends [1]
Selected Maine and Northeast U.S. Metropolitan Areas

Major Metropolitan Areas	Total Wage & Salary Employment [1]				Total Employment Change			Annual Growth Rate		
	1970	1980	1990	1997	1970-80	1980-90	1990-97	1970-80	1980-90	1990-97
Boston-Worcester-Lawrence-Lowell-Brockton, MA-NH (NECMA)	2,247,858	2,632,732	3,024,228	3,180,140	384,874	391,496	155,912	1.6%	1.4%	0.7%
New York-No. New Jersey-Long Island, NY-NJ-CT-PA (CMSA)	8,236,078	8,502,955	9,525,429	9,485,026	214,607	1,304,874	(262,399)	0.3%	1.1%	-0.1%
Philadelphia-Wilmington-Atlantic City, PA-NJ-DE-MD (CMSA)	2,335,707	2,466,466	2,878,719	2,958,791	106,931	443,613	55,127	0.5%	1.6%	0.4%
Pittsburgh, PA (MSA)	996,276	1,063,450	1,062,446	1,120,527	78,987	(34,356)	73,649	0.7%	-0.0%	0.8%
Cleveland-Akron, OH (CMSA)	1,273,048	1,329,512	1,405,687	1,526,914	74,990	32,564	127,968	0.4%	0.6%	1.2%
Detroit-Ann Arbor-Flint, MI (CMSA)	1,964,347	2,128,191	2,417,556	2,630,735	251,954	139,328	211,413	0.8%	1.3%	1.2%
Chicago-Gary-Kenosha, IL-IN-WI (CMSA)	3,460,668	3,758,630	4,198,578	4,600,113	358,490	320,316	424,923	0.8%	1.1%	1.3%
Other Selected MSAs										
Bangor, ME (NECMA)	46,724	60,043	69,733	69,779	13,319	9,690	46	2.5%	1.5%	0.0%
Lewiston-Auburn, ME (NECMA)	38,121	42,063	44,854	46,643	3,942	2,791	1,789	1.0%	0.6%	0.6%
Portland, ME (NECMA)	88,295	111,576	155,838	170,574	23,281	44,262	14,736	2.4%	3.4%	1.3%
Burlington, VT (NECMA)	54,474	70,965	97,631	108,272	16,491	26,666	10,641	2.7%	3.2%	1.5%
Springfield, MA (NECMA)	224,903	250,440	271,637	268,968	25,537	21,197	(2,669)	1.1%	0.8%	-0.1%
Pittsfield, MA (NECMA)	59,099	62,173	65,572	64,728	3,074	3,399	(844)	0.5%	0.5%	-0.2%
Providence-Warwick-Pawtucket, RI (NECMA)	352,937	397,390	436,550	435,772	44,453	39,160	(778)	1.2%	0.9%	-0.0%
Hartford, CT (NECMA)	472,027	571,950	665,029	626,645	99,923	93,079	(38,384)	1.9%	1.5%	-0.8%
Albany-Schenectady-Troy, NY (MSA)	322,143	362,757	439,561	444,375	40,614	76,804	4,814	1.2%	1.9%	0.2%
Glens Falls, NY (MSA)	35,813	41,218	49,713	51,682	5,405	8,495	1,969	1.4%	1.9%	0.6%
Utica-Rome, NY (MSA)	125,790	124,009	134,613	130,612	(1,781)	10,604	(4,001)	-0.1%	0.8%	-0.4%
Syracuse, NY (MSA)	259,051	293,255	352,205	346,668	34,204	58,950	(5,537)	1.2%	1.8%	-0.2%
Rochester, NY (MSA)	406,263	456,690	527,913	546,715	50,427	71,223	18,802	1.2%	1.5%	0.5%
Buffalo-Niagara Falls, NY (MSA)	513,353	521,792	558,902	562,250	8,439	37,110	3,348	0.2%	0.7%	0.1%
Erie, PA (MSA)	102,645	118,767	125,313	134,196	16,122	6,546	8,883	1.5%	0.5%	1.0%
Toledo, OH (MSA)	243,552	265,644	299,794	332,558	22,092	34,150	32,764	0.9%	1.2%	1.5%

NOTE:

[1] Employment totals include civilian non-farm wage & salary employees only.

Source: U.S. Department of Commerce, Bureau of Economic Analysis

Metropolitan Areas

Employment Trends

Comparable BEA forecasts for US metropolitan were not available. However, annual average wage and salary employment for states, metropolitan areas and counties are maintained by the BEA for 1969 through 1997. This information is summarized in Table II-13 for the 6 largest Consolidated Metropolitan Statistical Areas (CMSAs) in the Northeast.¹¹ In addition, 16 smaller MSAs (including three in Maine) are highlighted in the table. As noted previously, these MSAs are located relatively close to the US/Canadian border or to major transportation routes which either connect to Maine or could be connected via an east-west highway.

Among the MSAs listed in Table II-13, those with the fastest rates of job growth during the 1990s are concentrated in the Midwest States, while MSAs with the slowest job growth tend to be located in southern New England and New York. Not surprisingly, several of the metro areas with the largest job gains since 1990, such as Chicago, Detroit, Cleveland and Toledo, have strong trading relationships with Southwestern Ontario. Much of the recent job growth in these MSAs may be linked to the rapid expansion of US/Canada Trade.

Average annual job growth in most of the MSAs in New England and New York State from 1990 to 1997, were roughly half the rates experienced during the 1980s. Most of the MSAs located in Southern New England, with the exception of Boston, had not yet recovered pre-recession employment levels by the end of 1997. Similarly, the MSAs in New York State also experienced net job losses or very minimal gains. Portland and Burlington, Vt. out-performed most other New England MSAs in terms of 1990-97 job growth. Lewiston-Auburn was in the middle of the range of and Bangor was near the bottom, with no net job growth over the period.

Population and Employment Outlook

Similar market forecasts to those presented above for Eastern Canada's CMAs, were supplied for selected Northeast MSAs by Standard & Poor's DRI. However, the data provided were 5-year rather than 10-year forecasts. The geographic extent of the MSA's defined below may also be different than those presented in Table II-13. Because the forecasts are of a short-term nature and are less detailed than those obtained for Canada, each MSA is briefly highlighted below.

Boston (Pop 5.1 Million)

- The Boston PMSA is projected to achieve a 0.9% annual rate of job over the next 5 years, creating 121,000 new jobs;
- business services, software, biotech & pharmaceuticals, financial services, information technology & communications are leading growth sectors;
- declining export markets are hurting

lasting goods manufacturing sectors
high housing costs & low
unemployment will be a drag on
future expansion.

¹¹ In order of size, the largest metropolitan areas in the Northeast are New York, Chicago, Boston, Philadelphia, Detroit, Cleveland and Pittsburgh.

Table II-14
Summary Economic Outlook
Selected Northeast US Metropolitan Areas

	New York [1]	Buffalo- Niagara Falls	Albany Schenectady Troy	Syracuse	Rochester
Total Employment (1998)	3,984,700	546,200	433,200	337,000	528,900
Total Emp. Change (1998-2003)	86,600	1,600	11,400	3,000	7,900
Average Annual Job Growth	0.4%	0.1%	0.5%	0.2%	0.3%
1998 Unemployment Rate (%)	7.4	5.6	4.5	4.7	4.3
Population (1998)	8,618,000	1,159,000	877,000	737,000	1,088,000
Labor Force (1998)	4,007,000	583,000	454,000	365,000	573,000
Ann. Population Growth (98-03)	0.1%	-0.2%	0.3%	0.0%	0.3%
Ann. Wage Growth (98-03-Percent)	3.4	3.1	2.9	2.9	3.0
Avg Annual Housing Starts: (98-03)	12,433	2,450	2,533	1,117	2,317
		Boston [1]	Pittsburgh	Cleveland	Detroit
Total Employment (1998)		2,772,400	1,082,800	1,160,000	2,133,600
Total Emp. Change (1998-2003)		121,100	23,700	18,300	72,800
Average Annual Job Growth		0.9%	0.4%	0.3%	0.7%
1998 Unemployment Rate (%)		3.1	4.6	4.3	3.4
Population (1998)		5,122,000	2,357,000	2,224,000	4,489,000
Labor Force (1998)		2,753,000	1,160,000	1,134,000	2,267,000
Ann. Population Growth (98-03)		0.6%	-0.0%	-0.0%	0.5%
Ann. Wage Growth (98-03-Percent)		3.4	3.1	3.0	2.8
Avg Annual Housing Starts: (98-03)		15,900	5,767	6,400	16,150

NOTE:

[1] Standard & Poor's DRI uses the Primary Metropolitan Statistical Area (PMSA) for "New York" and "Boston". These regions are much smaller than the CMSA definitions used in Table II-13.

DRI McGraw Hill-US Markets Regional Review: Metro Focus, Third Quarter 1998

New York, NY-NJ (Pop 8.6 Million)

- Total employment is approaching 4.0 million;
- 1998 job growth (1.7%) is the strongest exhibited in 12 years;
- Manufacturing is a very small component of the regional economy (8% of total employment);
- Job growth projected to slow sharply (to 0.4%/year) over the next 5 years due in part to consolidation in the banking & insurance sectors

Upstate New York

- Four largest metro areas (Albany, Syracuse, Rochester, Buffalo) contain 1.8 million jobs;
- Minimal population and job growth expected over the next five years.

Pittsburgh, Cleveland & Detroit

- These 3 major metros combined contain 4.3 million jobs;
- Employment growth will slow to less than 0.5% per year over next 5 years, creating 115,000 jobs;
- Cleveland & Pittsburgh are both developing into major transportation & distribution centers;
- The outlook for manufacturing is uncertain in all 3 markets;
- Detroit is projected to have the strongest economic performance of the three metros due to several planned, large-scale infrastructure projects and an emerging gaming industry in Detroit & Windsor Ontario.

Maine

Wage and salary employment trends for Maine, the State's three MSAs and its Counties are presented in Table II-15 and the following three graphs. For purposes of this analysis, Maine's 16 counties were divided into two regions. The 10 counties which may be directly impacted by one of the four conceptual east-west highway corridors are collectively labeled the "Study Area Counties" or "Northern Maine" and the remaining six are labeled "Southern Maine".¹²

The long range trend line in Figure II-11 shows that the State of Maine has added roughly 204,000 wage and salary jobs over the past 28 years ending in 1997. When the effects of business cycles are removed from the graph, the rate of annual job growth averages just over 1.5% per year. As is also shown, Maine's economy was characterized by unusually strong growth during the 1980s, followed by a severe recession and slow recovery thereafter. Annual job growth since 1992 has been comparable to growth rates during the mid-1970s.

Figure II-12 illustrates the substantial differences in growth rates which have occurred in Northern and Southern Maine over this same period. (These differences are further highlighted Table II-15, which provides individual employment trend data for each county.) Whereas in 1969 there were substantially more jobs in Northern than Southern Maine (220,000 compared to 160,000), the regions had achieved near equal employment levels by 1997 (299,000 compared to 286,000 jobs). In addition, the Southern Counties had

**Total Wage & Salary Employment
1969-97: State of Maine**

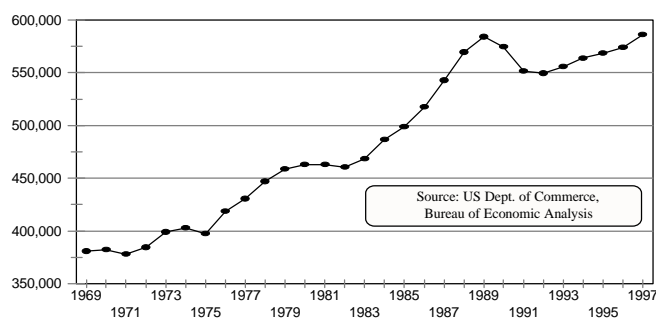


Figure II-11.

**Total Wage & Salary Employment
1969-97: Northern & Southern Maine [1]**

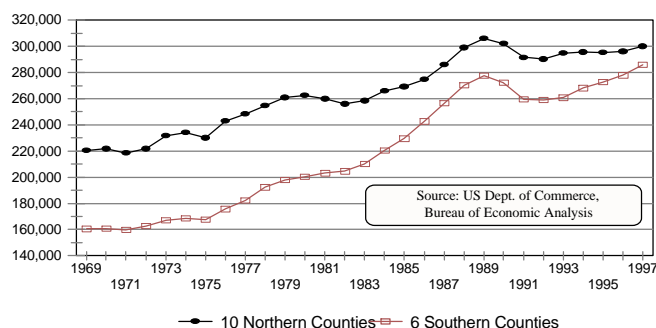


Figure II-12. [1] See footnote for definitions of Northern & Southern Maine

¹² The 10 Study Area Counties include Androscoggin, Aroostook, Franklin, Hancock, Kennebec, Oxford, Penobscot, Piscataquis, Somerset and Washington. The remaining Southern Maine counties consist of Cumberland, Knox, Lincoln, Sagadahoc, Waldo and York.

completely recovered and exceeded 1990-92 recession job losses by 1997, while Northern Maine had yet to do so. Overall rates of job growth in Northern Maine were nearly flat from 1992 to 1997.

Table II-15
Employment Trends: 1970-1997[1]
Maine, MSAs and Counties

	1970	1980	1990	1997	Annual Growth Rates		
					1970-80	1980-90	1990-97
Maine	382,416	462,824	574,507	586,076	1.9%	2.2%	0.3%
MSAs							
Bangor, ME (NECMA)	46,724	60,043	69,733	69,779	2.5%	1.5%	0.0%
Lewiston-Auburn, ME (NECMA)	38,121	42,063	44,854	46,643	1.0%	0.6%	0.6%
Portland, ME (NECMA)	88,295	111,576	155,838	170,574	2.4%	3.4%	1.3%
Northern Maine (Study Area) Counties							
Androscoggin	38,121	42,063	44,854	46,643	1.0%	0.6%	0.6%
Aroostook	32,940	33,748	37,094	31,575	0.2%	0.9%	-2.3%
Franklin	9,139	11,373	12,745	12,186	2.2%	1.1%	-0.6%
Hancock	11,564	15,107	20,608	22,905	2.7%	3.2%	1.5%
Kennebec	40,951	50,353	62,024	60,161	2.1%	2.1%	-0.4%
Oxford	14,926	18,142	17,931	18,374	2.0%	-0.1%	0.3%
Penobscot	46,724	60,043	69,733	69,779	2.5%	1.5%	0.0%
Piscataquis	5,326	6,280	6,544	6,339	1.7%	0.4%	-0.5%
Somerset	13,733	14,716	18,331	19,437	0.7%	2.2%	0.8%
Washington	8,231	10,686	12,344	12,569	2.6%	1.5%	0.3%
Subtotal:	221,655	262,511	302,208	299,968	1.7%	1.4%	-0.1%
Southern Maine Counties							
Cumberland	88,295	111,576	155,838	170,574	2.4%	3.4%	1.3%
Knox	9,196	11,778	15,039	18,369	2.5%	2.5%	2.9%
Lincoln	7,581	6,442	9,804	10,876	-1.6%	4.3%	1.5%
Sagadahoc	8,803	13,387	19,611	15,587	4.3%	3.9%	-3.2%
Waldo	6,538	6,784	7,754	8,856	0.4%	1.3%	1.9%
York	40,348	50,346	64,253	61,846	2.2%	2.5%	-0.5%
Subtotal:	160,761	200,313	272,299	286,108	2.2%	3.1%	0.7%

NOTE:

[1] Employment totals include civilian non-farm wage & salary employees only.

Source: U.S. Department of Commerce, Bureau of Economic Analysis

Table II-13 further illustrates how Maine's recent employment growth has varied greatly among the State's 16 Counties. Since 1990, six Maine counties have experienced net job losses, five have experienced growth rates below 1% per year and five counties generated job gains ranging from 1.3% to 2.9% percent. Only one of the five counties with post-1990 job growth above 1.0% per year (Hancock County) is located in "Northern Maine" as defined above.

Similar differences in the State's three metropolitan areas can be observed in Figure II-13. The Bangor MSA experienced virtually no net job growth from 1990 to 1997. By comparison, Bangor out-performed the state average in terms of job growth from 1970 to 1980, and had a healthy 1.5% rate of growth during the 1980s. The Lewiston-Auburn MSA has consistently under-performed the State's average rate of job growth since 1969, while the Portland MSA has exceeded the State average by about a percentage point.

County level population trends from 1990 to 1997 are contained in Appendix E. The population data show a similar growth pattern, with six counties experiencing population losses since 1990. Five counties have increased population by 4.0% or more since 1990 and the remainder have experienced minimal growth of under 4% or roughly 0.5% per year.

Total Wage & Salary Employment 1969-97: Maine Metropolitan Areas

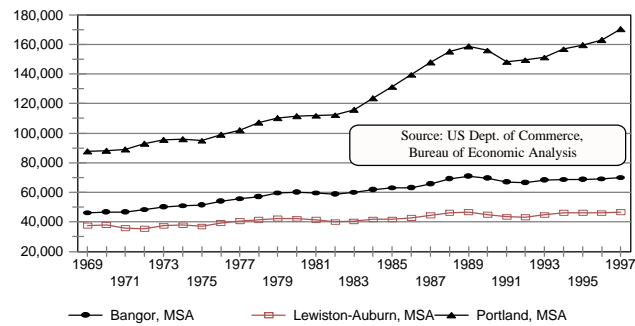


Figure II-13.

Summary Conclusions

In total, Maine is expected to grow by 71,000 people and gain 57,000 jobs from 1990 to 2000. Despite modest projections for the future, the State's population is still expected to grow by 275,000 between 2000 and 2025, while the economy adds another 134,000 jobs. However, population and employment growth during the 1990s has varied greatly among Maine's 16 Counties, and these trends are likely to continue without some form of major intervention to counteract long term trends.

Although Maine's economic growth has slowed considerably during the 1990s compared to prior decades, internal growth rates actually compare favorably in percentage terms to most other States in the Northeastern US, as well as the four Atlantic Provinces. Nearly all of the Northeastern US states and Eastern Provinces performed more poorly than Maine in terms of their respective rates of population and job growth during the 1990s. Similarly, nearly all are projected to slow in terms of population and job growth over the next two decades. Only Ontario is forecast to maintain annual growth rates above 1.0% over the long term. In light of these trends and forecasts, planning for an east-west highway through Maine should anticipate modest future growth rates, both internally, and in nearly all of the major consumer markets surrounding the state.

III

Transportation Infrastructure/Traffic Issues

Introduction

This chapter presents an inventory of the North Atlantic Regional transportation network. It qualitatively discusses the adequacy of the existing transportation infrastructure in Maine to attract regional economic markets of today and tomorrow, and provides an existing transportation context for the proposed East-West highway. The purpose and scope of this presentation is to provide a transportation context for the market trend data presented in Chapter II. The reader should understand that the Maine Department of Transportation is preparing a separate and more in-depth transportation analysis for this project, which includes the preparation of traffic forecasts for all five potential highway corridors.

The regional area of influence addressed in this chapter is depicted in Figure 1 and includes New York, New England, Maritime Canada, and Quebec. The following infrastructure elements are discussed:

- Interstate highways and major arterial roadways;
- Rail infrastructure and intermodal facilities;
- Freight and passenger ports;
- Airports; and
- Ferry services.

Interstate Highways and Major Arterial Roadways

This section presents an inventory of interstate highways and major roadways in the study area that service interregional travel. Interregional travel consists of trips with origins and ultimate destinations that involve the crossing of a regional boundary. The highway system in the New England region is the most dominant element of the interregional transportation system.

The study area supports interregional highway travel on Interstates 95, 93, 84, 89, 91 and 90, as indicated in Figure 1. All of the interstates within New England, with the exception of I-84 in Connecticut and I-90 in Massachusetts, are predominately oriented north to south. These facilities are equipped with rest areas with full amenities. In Canada, the major regional highway facility is the Trans-Canada Highway.

The New England interregional highways were inventoried and capacity constrained areas were identified as part of the New England Transportation Initiative (NETI) study in 1995. NETI was a cooperative venture of the six New England states to develop a coordinated strategic transportation planning vision as directed by the various states Departments of Transportation, Environmental Protection, and Economic Development.

Figure III-1 will be posted when available.

Pertaining to interstate facilities, the study identified corridors where traffic demands approach capacity during the peak demand periods, resulting in peak hour congestion. According to the study, twenty percent of the existing interstate highway miles in New England are congested during the evening peak period. These congested corridors include:

- I-95 throughout the state of Connecticut, Rhode Island, and in Massachusetts where it merges with Route 128 outside of Boston.
- I-95 in New Hampshire associated primarily with toll collection activities and I-95 in Southern Maine.
- I-91 approaching Hartford, Connecticut, and in the vicinity of downtown Springfield, Massachusetts. I-91 north of Massachusetts also experiences off-peak congestion over the winter season on Friday and Sunday evenings from recreational travelers to major ski resorts in Vermont and New Hampshire.
- I-84 throughout Connecticut; and
- I-93 in Massachusetts (approaching Boston) extending to southern New Hampshire.

Interstates and Major Roadways - Maine

The largest and most important component of Maine's transportation system is its roadway network. Maine's roadway network totals over 22,000 miles, comprised mostly of principal and minor arterials, collector roads, and local roads. I-95 is the only regional interstate facility in Maine, connecting the state with Southern New England and Canada. Through Maine, I-95 is a north-south toll facility varying from four to six lanes.

Maine's National Highway System consists of 367 miles of Interstate highways, and 903 miles of principal arterial roadways. While interstates and principal arterial roadways comprise only about 12 percent of the total state system mileage, they serve over 60 percent of the total vehicle-miles of travel. Local roads comprise 61 percent of total road mileage but carry only about 11 percent of total vehicle-miles of travel. Maine's transportation system generates 13 billion vehicle-miles of travel (VMT) on the highway system.

Over the next 20 years, travel in Maine is expected to grow by approximately 18 percent, compared to a projected 6 percent growth in population and 12 percent growth in employment, indicating that Maine residents will continue to travel increasingly longer distances. ¹

¹ Twenty Year Transportation Plan: 1998-2018, Maine Department of Transportation.

Existing urban and rural corridors that are projected in Maine's 20-Year Transportation Plan to become congested include:

- I-95, from Portland to Brunswick, and in Bangor;
- I-295 in Portland/South Portland;
- Route 1, from Bath to Wiscasset;
- Route 1, from Ogunquit to Wells;
- Route 1, from Rockland to Camden;
- Route 201, from Augusta to Gardiner;
- Route 302, from Portland to Windham.

I-295 in Portland and South Portland is currently the most heavily traveled urban highway corridor in Maine. I-95 between Portland and Brunswick is Maine's most heavily traveled rural highway experiencing moderate traffic congestion. Table 3-1 presents typical daily traffic volumes on I-95 and I-295, and other roadways in Maine that, for this study, are significant.

Table 3-1 **Maine's Major Roadways**

Roadway	Functional Classification	Description/Capacity	AADT¹ (Various Locations)
I-95	Interstate	North-south access controlled highway Six-lanes from just north of the New Hampshire state line To the York/Ogunquit town line Four-lanes from the York/Ogunquit town line to Houlton	2,300 (Houlton) 36,800 (Yarmouth) 18,200 (Richmond)
I-295	Interstate	North-south access controlled highway Four to six lanes	51,900 (Portland area) 69,800 (S. Portland)
Route 9	Principal arterial	East-west, two-lane roadway from Bangor to Calais	7,600 (Calais) 2,100 (Amherst) 11,400 (Bangor)
U.S Route 201	Principal arterial	North-south, two-lane roadway from Route 2 (Skowhegan) to Canadian border	1,420 (Jackman) 11,900 (Madison) 10,400 (Skowhegan)
U.S. Route 2	Principal arterial Minor arterial	East-west alignment from New Hampshire state line to Newport (principal arterial) North-south alignment from Newport to Houlton (minor arterial) Two-lanes	2,600 (Milford) 23,700 (Skowhegan) 18,100 (Farmington)
Route 1	Principal arterial Minor arterial Major collector	North-south, two-lane roadway from New Hampshire to Canada Minor arterial from Kittery to Topsham Principal Arterial from Topsham to Ellsworth Minor arterial from Ellsworth to Calais Major collector from Calais to Houlton Principal collector from Houlton to Fort Kent	2,000 (Fort Kent) 1,700 (Calais) 19,000 (Kittery)
Route 6	Minor arterial	East-west, two-lane roadway from Route 201 (Jackman) to the Canadian border at Vanceboro (designated as Route 6/15, 6/16, 6/155 west of Howland)	580 (Vanceboro) 4,150 (Lincoln) 9,450 (S. Lincoln)
Route 16/27	Minor arterial	North-south, two-lane roadway from Route 2(Farmington) to Canadian border	1,900 (Stratton) 8,400 (Fairbanks)

1. Two-way Average Annual Daily Traffic (AADT), expressed in vehicles per day (vpd).

Source: Traffic Volume Counts, Maine Department of Transportation, 1997.

Interstates and Major Roadways – Regional Context

Principal interstate facilities in the study area are described in the following paragraphs. Table 3-2 presents these interstate facilities. Traffic volumes are annual average daily traffic (AADT) volumes from published sources.

Table 3-2 Study Area Interstate Facilities

Roadway	Description/Capacity	Major Problem Areas/Congestion	Highest Recorded AADT ¹
I-95	North-south interstate from New York to Canada Four to eight lanes, divided	Throughout Connecticut, Rhode Island, and in Massachusetts where it merges with Route 128 outside of Boston. Southern Maine	144,000 (Stanford, CT) 170,000 (Providence, RI) 180,000 (Boston, MA)
I-91	North-south interstate from New Haven, Connecticut to Canada Four to six lanes, divided	Approaching Hartford, Connecticut, and in the vicinity of downtown Springfield, Massachusetts	137,000 (New Haven, CT)
I-84	East-west interstate from New York to Massachusetts Four to six lanes, divided	Throughout Connecticut	160,000 (Hartford, CT)
I-93	North-south interstate from Massachusetts to New Hampshire Six to eight lanes, divided	From Boston, extending north to southern New Hampshire	190,000 (Boston, MA)
I-89	Southeast-northwest interstate from Concord, New Hampshire to Burlington, Vermont, extending north to Canada from Burlington Four to six lanes, divided	None	33,000 (Lebanon, NH)
I-90	East-west interstate from Boston to Albany, New York and beyond Four to eight lanes, divided	Tollbooth delays approaching and departing metropolitan Boston	100,000 (Boston, MA)
Trans-Canada Highway	Major highway across Canada extending from Ontario to New Brunswick in study area Two to six lanes	In the vicinity of Montreal	136,000 (Montreal, CAN)

1. Two-way Average Annual Daily Traffic (AADT), expressed in vehicles per day (vpd).

Sources: 1997 Traffic Log, Connecticut Department of Transportation.

Special Count Report, Rhode Island Department of Transportation, 1995.

1996 Traffic Volumes, MassHighway Department.

1997 Traffic Counts, New Hampshire Department of Transportation.

Interstate 95

I-95 is a major regional north-south corridor from New York City to Houlton, Maine. Through Connecticut, I-95 runs along the Long Island Sound shoreline, providing a direct link to all points in Connecticut from New York City, Boston, and Providence. Through Massachusetts, I-95 approaches Boston and connects with Route 128 as the principal beltway around Metropolitan Boston. Continuing north to New Hampshire and southern Maine, I-95 runs along the Atlantic Ocean shoreline, connecting the major cities of Portsmouth, New Hampshire and Portland, Maine. From Portland, I-95 connects to Augusta and Bangor, Maine. I-95 continues north past Bangor, and terminates in Houlton at the Maine/Canada border crossing. I-95 connects directly to the Canadian road network.

As identified in Table 3-2, I-95 has several constrained areas with traffic demands up to 180,000 vehicles per day (vpd). Tourist information centers are provided on I-95 at the Massachusetts/New Hampshire line and in Maine at the Maine/New Hampshire line.

Interstate 91

I-91 is a major regional north-south highway linking southern Connecticut and the Metropolitan New York area with western Massachusetts, Vermont and New Hampshire. It continues north through New England to Canada. I-91 connects directly into the Canadian road network via Autoroute 55.

I-91 carries significant truck traffic and recreational travel to tourist destinations including the major ski resorts in Vermont and New Hampshire over the winter season. I-91 begins at I-95 in New Haven, Connecticut and continues north up the Connecticut River Valley through western Massachusetts and Vermont. Recurring congestion occurs from New Haven to Hartford, where I-91 carries up to 137,000 vpd. A tourist information center is provided on I-91 at the Massachusetts/New Hampshire line.

Interstate 84

I-84 travels southwest from central Massachusetts through central Connecticut into New York and is one of the primary highway routes between Boston and New York. I-84 provides direct access to Hartford, and indirect access to other communities via arterial connections. For the most part, I-84 is a six-lane interstate highway. Recurring congestion occurs on I-84 near Hartford, where it carries 160,000 vpd. A tourist information center is provided on I-84 in Connecticut, approaching the New York state line.

Interstate 93

I-93 is a north-south highway joining northern Vermont and New Hampshire with the metropolitan Boston area, Cape Cod, and Providence, Rhode Island. I-93 directly links the major cities of Boston, Manchester, and Concord. I-93 ends at I-91 in northern Vermont. Recurring congestion on I-93 occurs from the New Hampshire/Massachusetts border, to the metropolitan Boston area where I-93 carries up to 190,000 vpd. A tourist information center is provided on I-93 in New Hampshire at the New Hampshire/Vermont line.

Interstate 89

I-89 crosses the states of Vermont and New Hampshire in a southeast-northwest manner. I-89 links Burlington and Montpelier with Concord, New Hampshire. I-89 carries a significant amount of recreational travelers in the winter months. I-89 is relatively free of recurring congestion.

Interstate 90

I-90 is the major controlled access highway for east-west interstate travel in Massachusetts, directly linking Boston with Albany, New York and beyond. I-90 varies from four to eight-lanes carrying from 17,000 vpd near the New York/Massachusetts state line to 100,000 vpd approaching Boston. Tollbooth delays are fairly common, especially approaching and departing metropolitan Boston. A tourist information center is provided on I-90 in Massachusetts, in advance of the New York state line.

Trans-Canada Highway

The Trans-Canada Highway integrates Canada with the New England interstate network. The Trans-Canada Highway runs from St. John's in Newfoundland to Vancouver Island in British Columbia, a distance of nearly five thousand miles. The Trans-Canada was constructed in the 1950's and '60s as a two-lane roadway to provide a continuous link from the Atlantic to the Pacific Oceans. In the late 1980's, improvements were made to the Trans-Canada to address increasing traffic demands. Today, the Trans-Canada Highway varies from a two-lane road to a divided highway ranging from two to six lanes.

Located along the axis of the Saint Lawrence River, the Trans-Canada Highway connects major urban centers of Ottawa, Quebec, and Montreal within the study area. In the vicinity of Montreal, the Trans-Canada follows Route 20 on an east-west alignment, carrying up to 136,000 vpd. Between Montreal and Quebec City, traffic volumes are much lower – about 25,000 vpd. Through Quebec, volumes along the Trans-Canada increase to about 60,000 vpd. East of Quebec City to Riviere du-Loup (still designated Route 20), the Trans-Canada carries only up to 10,000 vpd.

At Riviere du-Loup, the Trans-Canada follows Route 2 on a north-south alignment, carrying only up to 5,000 vpd to the New Brunswick/Quebec province boundary. South of the New Brunswick/Quebec province boundary, traffic volumes on the Trans-Canada remain low, except in Fredericton, where demand increases to about 20,000 vpd. South of Fredericton, volumes return to about 5,000 vpd.

The Trans-Canada connects with Route 1 in Sussex, New Brunswick. Route 1 runs west through Saint John to Route 9 in Calais, Maine and links Route 9 with the Trans-Canada Highway. Traffic volumes on Route 1 in the vicinity of Saint John are 8,000 vpd.

Border Crossings

Border crossing data provides an indication of origins and destinations of regional traffic and activity between Maine and Canada. There are numerous border crossings between Canada and Maine, mostly between New Brunswick and Maine (Jackman and Coburn Gore are the only major border crossings between Maine and Quebec). Table 3-3 quantifies border crossing activity using data from the United States Customs Service.

For vehicles entering Maine, Calais and Madawaska account for about 60 percent of incoming passenger vehicles. In fact, the Calais crossing alone handles almost 40 percent of incoming vehicles. Calais, Houlton, and Jackman account for about 75 percent of total incoming trucks. About one third of the total traffic crossing at Jackman were classified as heavy vehicles.

Table 3-3 Maine/Canada Border Crossing Activity, 1997

Border Crossing	<u>Incoming Passenger Vehicles</u>		<u>Incoming Heavy Vehicles</u>	
	1997 Total	Percent	1997 Total	Percent
Calais (Route 9)	1,561,000	36%	126,000	29%
Madawaska (Route 1)	897,000	21%	21,000	5%
Van Buren (Route 1)	427,000	10%	19,000	4%
Houlton (I-95)	414,000	10%	108,000	24%
Fort Kent (Route 11) ¹	324,000	7%	13,000	3%
Jackman (Route 201)	217,000	5%	100,000	22%
Fort Fairfield (Route 1A) ¹	202,000	5%	15,000	3%
Bridgewater (Route 1) ²	103,000	2%	8,000	2%
Coburn Gore (Route 27)	76,000	2%	24,000	5%
Vanceboro (Route 6)	60,000	1%	5,000	1%
Limestone (Route 89) ¹	59,000	1%	9,000	2%

1. No data were available for the month of December.

2. No data were available for the months of November and December.

Sources: United States Customs Service, Mission Support Services, Office of Field Operations

Truck Flows

In support of the East-West Highway Project, truck volumes were estimated for various origin-destination (OD) pairs using data from a 1997 For-Hire Trucking Survey conducted by Statistics Canada and truck weight data collected on the Trans-Canada Highway by the New Brunswick Department of Transportation. The purpose of analyzing these data was to arrive at an order of magnitude estimate of truck flows between Canada and the United States.

The Statistics Canada survey estimated the yearly tonnage for truck shipments with either Canadian origins or Canadian destinations. The database contains about 29,000 records. The raw OD survey data were aggregated as follows:

- New Brunswick data were disaggregated by county;
- Relevant urban areas of Quebec (Montreal, Quebec City, and Sherbrooke) were disaggregated;

- United States OD's were aggregated by region (Southern New England, Northern New England, New York/New Jersey/Pennsylvania, Southeast United States, Midwest United States, and Western United States).

In past analyses, Statistics Canada has converted shipment data to trucks using 22 metric tons per truck as a conversion. The shipment data were therefore converted to truck flows using 22 metric tons per shipment (to be consistent with Statistics Canada). The following O-D tables were developed from the Statistics Canada data:

- Table 3-4: Annual Truck Flows (assuming 22 metric tons per truck);
- Table 3-5: Average Annual Daily Truck Flows (assuming 22 metric tons per truck);

The next step for the East-West Highway project is to use these truck flows to estimate the volume of trucks that could potentially divert to an East-West Highway through Maine due to significant travel time savings. These calculations will be made during the following phase of the analysis, after completion of the survey process.

Table 3-4 will be posted when available.

Table 3-5 will be posted when available.

Planned Upgrades/New Highway Facilities

Highway mobility improvement projects in Maine identified in the Six Year Transportation Plan include:

- Augusta to Manchester, Route 202 – involves the construction of additional travel lanes;
- Portland, I-295 Connector – construction of a new highway from I-295 to Portland Harbor;
- Portland, I-295 – reconstruction of the Forest Avenue interchange.
- Saco, Route 1 – widening the 4-lane section between I-195 and Route 98.

In New Brunswick, a new 195 kilometer, four-lane toll highway is planned from Fredericton to Moncton, New Brunswick. This toll highway will serve as an alternate route to the Trans-Canada Highway, with anticipated time saving of approximately 30-35 minutes from end-to-end. The new highway will be equipped with electronic toll collection technology and is anticipated to be open to traffic in November 2001. The new highway will be designated a truck route, requiring trucks traveling through the region to use the toll road, making existing travel routes such as the Trans-Canada safer for passenger traffic. The planned facility ends at Route 2 (Trans-Canada Highway) at Fredericton which continues west to I-95 in Houlton, Maine.

Another key infrastructure project that was completed in late 1997 was the construction of the Confederation Bridge between the provinces of Prince Edward Island and New Brunswick. The 12.9 km bridge physically connects the province of Prince Edward Island with mainland New Brunswick.

In Quebec, bypass projects are planned for the cities of Montreal and Sherbrooke. The Route 73/Autoroute 173 corridor from Quebec City to Beauceville will be upgraded to a 2-lane controlled access roadway. South of Beauceville, Autoroute 173 continues south and connects with Maine's Route 201 in the vicinity of Moose River, Maine. No other major corridor improvements are planned for roads connecting Quebec and Maine.

Rail Infrastructure

The study area rail infrastructure network is depicted in Figure 2. Similar to the interstate facilities in the study area, the rail network is predominately oriented north to south in New England, and especially Maine.

In New England, there are 31 railroads that own or operate rail lines in New England. The major, regional carriers in the study area are Amtrak, Conrail, Guilford Transportation Industries, Canadian American, Bangor and Aroostook, St. Lawrence and Atlantic, Central Vermont, and Providence and Worcester. Two public agencies in the region, the Massachusetts Bay Transportation Authority (MBTA) and the Connecticut Department of Transportation operate substantial commuter rail networks in Boston and southwest Connecticut, respectively.

Figure III-2 will be posted when available.

Intercity passenger service in the study area is provided by Amtrak and includes shore-line service from Boston to New York City and points south, and inland service from Boston to points west and south via Springfield and Hartford. Amtrak service also extends through Vermont, to Montreal. The only Amtrak destination in New Hampshire is in Claremont. Passenger rail transportation is currently not provided to Maine by Amtrak, although a Portland to Boston connection is planned to be in operation in the next 2 to 3 years.

Maine Rail Infrastructure

The State of Maine has over 1,100 miles of railroad track operated by seven private railroads. Pulp, paper, lumber, and other wood products account for a majority of the total freight rail tonnage originating within Maine. Major rail connection points where various lines meet are at Brownville and Hermon (west of Bangor).

Maine is served by three regional railroads: The Bangor & Aroostook Railroad (BAR); the Guilford Rail System, and the St. Lawrence & Atlantic Railroad. All three have connections with large national carriers. The BAR connects Searsport, Patten, Limestone, Ashland, Fort Kent, and Van Buren. The main track extends predominately north to south from Searsport, north to Van Buren. Minor east-west spurs from the mainline branch off at Houlton and Presque Isle.

The Guilford Rail System is a regional rail line that runs from Mattawamkeag, southwest to Bucksport, Portland, and Portsmouth, and continuing through Lawrence, Massachusetts to Rotterdam Junction, New York. In the study area, the St. Lawrence & Atlantic Railroad runs from Montreal to Portland. This railroad is affiliated with the Canadian National Railroad and connects Maine with the U.S. Midwest and Halifax, Nova Scotia.

Other railroads in Maine include:

- Eastern Maine Railroad/New Brunswick Southern Railroad –operates between Brownville junction and Vanceboro, continuing to St. John, New Brunswick.
- Belfast & Moosehead Lake Railroad –a relatively small length of rail track (about 33 miles) between Belfast and Burnham Junction, Maine. Since the mid-1980's, excursion trains have been the primary traffic on this line.
- Maine Coast Railroad – operates along the coastline, connecting Rockland, Brunswick, Wiscasset, and Augusta on about 90 miles of track supporting freight and excursion services between Brunswick to Rockland and Augusta.
- Canadian American Railroad – operates from Brownville Junction to the Quebec border and beyond.

Maine Truck/Rail Intermodal Facilities

Intermodal transfer facilities provide for the transfer of shipments between rail and truck modes. In Maine, these facilities currently exist in Auburn (on the St. Lawrence & Atlantic Railroad), in Waterville (on the Guilford Rail System) and in Bangor (on the BAR). Another facility will be constructed in the spring of 1999 in Presque Isle, Maine. This facility will enable cargo containers to be transferred to train flatbeds, allowing rail users and freight haulers the opportunity for dedicated train service to southern Maine and other parts of

New England.

In Jackman and Houlton, Maine, facilities are planned which will enable the transfer of forest products from truck to rail. These facilities will shift long-haul truck cargo to the existing rail line, thereby reducing heavy vehicle traffic from Maine roadways.

Freight and Passenger Ports

Principal ports for freight and passenger transportation in New England include:

- Eastport, Portland, and Searsport, Maine;
- Portsmouth, New Hampshire;
- Boston, New Bedford, Fall River, Massachusetts;
- Providence, Davisville, Rhode Island;
- New London, New Haven, Bridgeport, Connecticut.

Maine's Ports

Maine's three deep water ports of Eastport, Portland, and Searsport have shown steady, consistent growth and expansion in the past 10 years. Portland is a public/private facility specializing in containers and breakbulk and bulk products. Direct rail access to the Port is provided by the Guilford Rail System. The port has a public container operation that allows for the transfer of containerized cargo to trucks. Portland is the only operating container facility in New England besides Boston. The NETI study compared New England Port Volumes from 1991 and concluded that Portland carried the second highest volume of products in the New England region, second to Boston. Planned improvements to this port include the construction of an I-295 connector to improve highway access to the port as well as dedicating more storage for the container operation.

Searsport and Portland also have direct rail access for non-containerized cargo. Eastport is primarily export-based. Eastport's primary customer is Georgia Pacific which exports value-added forest products. Eastport has the deepest water of any port between Halifax, Nova Scotia and Norfolk, Virginia and is the only export-based port in New England. A new \$19 million, 634-foot pier was constructed in July 1998 at the port of Eastport. Searsport has access to the Bangor and Aroostook Railroad and currently handles bulk and breakbulk products. Planned redevelopment efforts at Mack Point in Searsport include two new modern piers with four fully serviceable berths providing increased capacity and more efficient service at Searsport.

According to the 20-Year Transportation Plan, Maine's port traffic was about 1.4 million tons in 1996 – an increase of 100 percent from 1986. Maine's ports have experienced average annual growth rates of about 7.6 percent over the last 10 years. This growth is attributable to continuous improvements to, and development of Maine's port infrastructure resulting in Maine shippers using Maine ports instead of out-of-state and Canadian ports. ²

² Integrated Freight Plan. Maine Department of Transportation Office of Freight Transportation. May 1998.

Canada's Ports

Canadian national marine policy categorizes ports as:

- National Ports (Canadian port authorities)- Canadian port authorities (CPAs) are independent management corporations mandated to operate ports deemed essential to domestic and international trade, forming a national ports system.
- regional and local ports - These ports, smaller than the CPAs, serve regional and local economic, tourism and recreational needs.
- remote ports.

Canada's major commercial ports in the study area are Montreal, Halifax, and St. John. In 1996, these ports handled 7.9, 3.2, and 0.23 million metric tons of container traffic. Comparatively, Portland handled about 49,000 metric tons in 1996.³

Table 3-6 provides an indication of activity levels at major study area ports for containerized traffic. As the table indicates, Maine's capabilities in the area of container traffic are limited to Portland. Regionally, Portland attracts a relatively small share of the container traffic.

Table 3-6 Study Area Port Container Traffic, 1996

Port	TEU's ¹	Metric tons
Montreal, Quebec	852,530	7,948,309
Halifax, Nova Scotia	392,273	3,178,392
Boston, MA	127,087	939,852
St. John, New Brunswick	37,026	234,229
Portland, ME	4,177	49,294

1. TEU is the standard international unit of measurement for containers. One TEU is almost equivalent to one 20-foot container.

Source: American Association of Port Authorities Advisory

Airports

The New England region is home to several commercial airports with significant levels of scheduled passenger service. In Maritime Canada and Quebec, there are 11 airports that are part of Canada's National Airport System and have regional significance (this includes Ottawa airport in Ontario).

³ Integrated Freight Plan. Maine Department of Transportation Office of Freight Transportation. May 1998.

Air Passenger Traffic

Demand for air passenger transportation is significantly effected by the regional economy and is measured by the level of passenger activity in terms of enplanements, deplanements and connections. By this measure, Logan International captures the majority of this demand in New England serving 25.1 million passengers in 1996. Bradley International and TF Green (Providence) also capture significant market shares, serving 5.3 and 2.5 million passengers in 1996, respectively. Of the Canadian airports in the study area (including Ontario), Toronto International serves as the hub for air passenger traffic, serving 22.7 million passengers in 1996 – slightly less than Logan International. Dorval Airport in Quebec served 6.1 million and Ottawa served 2.8 million passengers. Table 3-7 summarizes these activity levels for 1996.

Table 3-7 Study Area Major Airports

Airport	City, State/Province	1996 Passenger Activity¹
Logan	Boston, Massachusetts	25,135,000
Toronto	Toronto, Ontario	22,669,000
Dorval	Montreal, Quebec	6,142,000
Bradley	Hartford, Connecticut	5,280,000
Ottawa	Ottawa, Ontario	2,763,000
TF Green	Providence, Rhode Island	2,490,000
Halifax	Halifax, Nova Scotia	2,462,000
Mirabel	Montreal, Quebec	2,391,000
Portland International Jetport	Portland, Maine	1,140,000
Manchester	Manchester, New Hampshire	1,000,000
Burlington	Burlington, Vermont	830,000
Bangor International	Bangor, Maine	720,000

1. Passenger activity includes enplanements, deplanements, and connecting passengers.

Sources: Logan Airport 1996 Annual Update, September 1997.

Statistics Canada

Air Freight Traffic

A competitive global economy relies on timely and efficient delivery of goods. This role is increasingly assumed by air cargo carriers. In New England, Logan Airport serves as the hub for international air freight movements, handling about 450,000 tons of cargo per year.⁴ Of the Canadian airports in the study area (including Ontario), Toronto International Airport and Mirabel Airport handle the bulk of cargo shipments. Toronto handles about 340,000 tons annually and Mirabel about 80,000 tons annually.⁵

In the past decade, the growth of service-based industries in Maine has resulted in dependence on air freight to move time sensitive goods, which are typically small, lightweight, and high-value. Air freight is a relatively small (tonnage wise) but economically important part of freight transportation within the state of Maine, especially for the transport of perishable commodities such as marine resources (lobsters) and time-sensitive goods such as overnight packages and mail. Air freight in Maine is handled primarily at the Portland International Jetport and the Bangor International Airport.⁶

Ferry Services

This section describes the ferry services that are provided in the study area. Figure 2 depicts these major ferry routes.

Maine ferry service

Passenger transportation via ferry is provided by the Maine State Ferry Service. The system is owned by the State of Maine, and provides year round service. Scheduled service is provided to Islesboro, North Haven, Vinalhaven, Swan's Island, Manticus, and Frenchboro, as follows:

- Vinalhaven Ferry –between Vinalhaven and Rockland, operating year-round on weekdays and weekends;
- North Haven Ferry –between North Haven and Rockland, operating year-round on weekdays and weekends;
- Maticus Island Ferry –between Rockland and Maticus Island, operating on select days of the year (about 24 days/year);
- Swans Island Ferry –between Swans Island and Bass Harbor, operating year-round on weekdays (except Thursdays) and weekends;
- Islesboro Ferry –between Islesboro and Lincolnville, operating year-round on weekdays and weekends;
- Frenchboro Ferry –between Bass Harbor and Frenchboro, operating year-round, limited weekday and weekend service.

⁴ Logan Airport 1996 Annual Update; September 1997.

⁵ Source: Statistics Canada

⁶ Integrated Freight Plan, Maine Department of Transportation Office of Freight Transportation, May 1998.

Ridership on the ferry service has increased by 38 percent from 1987 to 1997. In 1997, ridership totaled over 460,000 passengers. Issues facing Maine's ferry service include vessel replacement needs, pier and bridge improvements, parking shortage, demand approaching capacity for the Vinalhaven service, transportation of wastes and fuels, and increased demand to island destinations.

Long-distance luxury cruises to Yarmouth, Nova Scotia are also provided on a reservation basis, from Portland and Bar Harbor. This service is privately run, and not affiliated with the Maine State Ferry Service.

Other Study Area Ferry Services

Year-round ferry service is also operated out of the Metropolitan Boston area and is primarily commuter oriented. Recreational ferry services operating on a seasonal basis are provided from Boston to the Boston Harbor Islands, Nantucket Island, Martha's Vineyard Island, and to Provincetown, on the tip of Cape Cod.

In Connecticut, commuter oriented ferry service links southern Connecticut with Long Island, New York. Like Maine, Rhode Island ferry service is recreational-oriented, from Providence to Block Island and from Point Judith to Block Island.

Regional Transportation Planning

This section overviews regional short and long-term transportation plans for the State of Maine and for Maritime Canada and Quebec. The following plans were reviewed:

- The Maine Department of Transportation Six Year Plan
- The Maine Department of Transportation Twenty Year Plan
- Transportation in Canada Annual Report

MDOT Twenty Year Transportation Plan

In addition to this East-West Highway study, several other major feasibility studies in Maine are currently underway. Some of these studies identified in the Twenty Year Transportation Plan include:

- Bath Westerly Access – feasibility of strategies to improve Bath area access to and from points west;
- Eastport Freight Access – feasibility of highway/rail strategies to improve inland access to the port of Eastport;
- Gorham-Portland Corridor – preliminary engineering and environmental studies of bypass alternatives around Gorham village;
- Houlton-Ft. Kent Corridor – feasibility of strategies to improve north-south interstate access in Aroostook County;
- Rockland Waterfront Corridor – feasibility of strategies to improve Route 1 access to the Rockland waterfront;
- Route 9/Interstate Access – feasibility of strategies to improve access between Route 9 in Eddington and the Interstate Highway System;

- Skowhegan Transportation Study – feasibility of strategies to relieve congestion and improve safety in the Skowhegan area; and
- Wiscasset Bypass Study – preliminary engineering and environmental studies of bypass alternatives and other Route 1 improvements.

MDOT Six Year Transportation Plan

The Six-Year Transportation Plan proposes the initiation of the following major new feasibility studies:

- Bangor Area Interstate Corridor Study – to determine an appropriate capital investment strategy that maintains the structural integrity of I-95 bridges in the Bangor area;
- Calais-St. Stephen Border Crossing Study – to conduct a location and environmental assessment for a proposed new border crossing in the Calais/St. Stephen area.
- Ellsworth Corridor Study – to identify feasible long-term solutions to growing traffic congestion in Ellsworth and on roadways approaching this urban area (Route 1, 1A, and Route 3);
- Newport Interstate Access Study – to find a feasible means of improving access to I-95 from industrial park land in the Newport area;
- Portland Area Interstate Corridor – to find a cost-effective means of minimizing traffic congestion on the I-295 corridor in Portland and South Portland;
- Portland-Brunswick Interstate Corridor – to develop a long-term strategy for mitigating growth in traffic congestion on I-95 between Portland and Brunswick.

Transportation in Canada Annual Report

The Transportation in Canada 1997 Annual Report provides a summary of multimodal financial and operating statistics for the year focusing on trends in Canada's freight transportation. The report states that:

- Over the past 16 years, freight transportation has shifted to the trucking mode – from a 21 percent share of the gross domestic product in 1981 to a 35 percent share in 1997, attributable to factors such as “just in time” delivery and more competitive trucking costs versus other modes.
- Since 1988, Canada's exports of goods to the United States have increased by 114 percent, while exports to the rest of the world have increased by 33 percent.
- In 1988, Canada's export business to the United States represented 15 percent of all goods moved in Canada. In 1997, this increased to 23 percent.
- In 1997, over two thirds of Canada's imported goods came from the United States.
- Canada's roadway infrastructure plays an important role in freight transport. Almost half of Canada's exports in 1997 were shipped by road. For imports, road is by far the most used method of shipping, at 62 percent.

Summary Conclusions

While interstates and principal arterial roadways comprise only about 12 percent of Maine's total state system mileage, they serve over 60 percent of the estimated 13 billion vehicle-miles of travel (VMT) on the state's highway system. In addition, travel in Maine is expected to grow by approximately 18 percent over the next 20 years, adding another 2.3 billion vehicle miles to the existing system. These projections indicate that Maine residents will continue to travel more frequently and over increasing distances in the future. In addition to providing potential economic development benefits to the state, the proposed east-west highway may also play a role in accommodating future in-state travel demand. Both functions will be evaluated in later phases of this study.

According to 1997 border crossing data, approximately 4.3 million passenger vehicles and 450,000 heavy vehicles entered the State of Maine at 11 Canadian border crossing locations. This translated to an average of roughly 11,900 incoming passenger vehicles and 1,230 incoming trucks per day at all locations. Approximately 35% of all incoming Canadian traffic entered Maine through Calais. Calais and Madawaska accounted for about 60 percent of incoming passenger vehicles, while Calais, Houlton, and Jackman together account for about 75 percent of total incoming trucks.

Consistent with the above border crossing counts, average daily traffic volumes along most of the major roadways located at Maine's borders with Canada are light. Average annual daily two-way traffic counts taken at points near the state's major border crossings are generally below 2,500 vehicles per day with the exception of Route 9 in Calais, which carries 7,600 vpd. Planning is under way to improve the border crossing at Calais/St. Stephen, but no other infrastructure investments appear to be under consideration for the state's remaining border crossings.

Available traffic volume data suggest that the daily number of inter-provincial trips along the Trans-Canada Highway from the Atlantic Provinces to points west of Quebec City, is also modest. This observation is based upon the steadily declining traffic counts along major segments of the Trans-Canada moving eastward from Montreal. In particular traffic counts along most sections of the Trans-Canada from Riviere du-Loup to Route 1 in New Brunswick are in the 5,000 vpd range. In addition, the estimated number of daily truck trips between all of the Atlantic Provinces and Ontario/Quebec are of an order of magnitude of a few hundred per day. Origin-destination pairs also indicate that only a percentage of these trips would be potential candidates for diversion to an east-west highway through Maine.

Other components of Maine's freight transportation system, including rail/intermodal facilities, ports and airports, are experiencing growing demand. The potential of an east-west highway to enhance the operations of these facilities should also be examined as the study progresses.

IV

Commodity Flows

Introduction and Methodology

The purpose of this section is to analyze and describe the existing flow of commodities into and out of the State of Maine and the Atlantic Provinces. Although previous sections of this report have discussed trends in US/Canada trade, cross border truck traffic and similar issues, the following analysis greatly expands the level of detail provided. The analysis addresses the types of commodities moved through these regions, the origins and destinations of shipments and the modes of transportation used to move various types of commodities. Data presented for the State of Maine includes commodity flows to and from other US markets, in addition to imports and exports to/from Canadian markets. Similar information is also provided for the Atlantic Provinces.

All values discussed in this section are measured in tons rather than dollars, in order to provide a basis for eventually converting the data to numbers of shipments and/or vehicle trips. Commodity flows are estimated for calendar year 1997. Forecasts of future originations and attractions of commodities by Maine's Counties will be addressed in Phase II.

The methodology used to generate the commodity flow estimates is described in the following paragraphs.

Commodity Compass Freight Database

Standard & Poor's DRI has developed a comprehensive forecast database of freight flows, with identification of origins, destinations, commodities, and primary shipment mode. The database covers all counties of the United States, and also includes overland trade between U.S. counties and Canadian provinces and Mexican states. Commodities are specified to the four-digit STCC level. Modes are distinguished as air, inland water, rail carload, rail intermodal, private truck, truckload, and less than truckload.

The database was designed to support flexible, diverse, and varied custom aggregations. The forecasts presented and discussed in this section were developed through geographic, commodity, and modal aggregation of the more detailed forecasts in the Commodity Compass Freight Database. Consequently, the following discussion of the methodology supporting the Freight Database provides an understanding of how the estimates were constructed.

Forecasting Process

Commodity Compass Freight Database identifies historical patterns of freight flows by origin, destination, commodity, and mode. These flows are then attributed to production and demand by commodity and county, and to imports and exports for counties with ports. From the perspective of domestic transportation, the volume of freight originating in a county is the sum of what is produced in the county plus what enters the United States through the county's ports. Similarly, the total domestic freight terminating in a county includes both what is used there and what goes there to leave the nation through the county's ports.

Crucial resources supporting the historical picture included production and demand data from DRI's Regional Economic Service, international shipping volumes for DRI's World Sea Trade Service, domestic freight volumes from Reebie Associates' Transearch database, and import and export volumes from the Port Import/Export Reporting Service (PIERS).

Central to the development of the Commodity Compass Freight Database and particularly the forecasts to be developed in Phase II, is a set of mode- and commodity-specific gravity models. These gravity models mathematically formalized the historical patterns among the geographies of freight origination (production plus imports), termination (domestic demand plus exports), and commodity movements. A separate gravity model was developed for each commodity/mode combination. A fundamental premise of the gravity model is that, other things being equal, demands for a commodity are more likely to be served by nearby rather than distant sources.

Data Limitations

While the database provides extensive modal and commodity coverage, there are omissions. These gaps appear in the historical portrait and are perpetuated in the forecasts. Most of the omissions arise in the truck modes. We have neither private truck nor truckload data for commodities with the following two-digit Standard Transportation Commodity Codes (STCC):

- 08 Forest Products
- 09 Fresh Fish or Marine Products
- 10 Metallic Ores
- 11 Coal
- 13 Crude Petroleum or Natural Gas
- 14 Nonmetallic Minerals
- 19 Ordnance or Accessories
- 40 Waste or Scrap Materials
- 41 Miscellaneous Freight Shipments
- 42 Shipping Containers
- 43 Mail or Contract Traffic
- 44 Freight Forwarder Traffic
- 45 Shipper Association Traffic
- 46 Miscellaneous Mixed Shipments
- 47 Small Packaged Freight Shipments

The pattern of omissions for less-than-truckload is similar, except that we lack data for farm products (STCC 01), but have it for ordnance (STCC 19). There are some minor omissions for other modes, with rail the most complete and water and air slightly less so.

The omissions are primarily in commodities for which the missing modes account for small shares of total tons and smaller shares of ton-miles. While we believe the omissions are of minimal importance to the broad picture of freight flows, there will inevitably be potential applications in which they are burdensome. For example, some of the above two-digit STCCs, particularly STCCs 08 and 09, are obviously important to Maine. According to the Census of Transportation, 1992 Truck Use Survey, “logs and other forest products” and “farm products” were both among the top ten Maine commodities shipped by truck, accounting for 6% and 10% of total truck movements, respectively.¹

Therefore, the reader should note that the following tonnage estimates of commodity movements by truck may be modestly understated by the omissions of the above commodity groups. However, these omissions will not result in similarly understated estimates of truck trips and resulting truck traffic forecasts for the East-West Highway. The truck traffic estimates/projections developed by MDOT capture all truck movements, including those which may be omitted in this analysis.

Another omission is the absence of pipeline data. The significance of this is somewhat different, in that pipeline is a very significant mode for some of few commodities moving by it. Excluding pipeline means that our coverage of those commodities is severely restricted.

A second class of limitation arises out of our treatment of modal split. Modal choice is not treated as sensitive to price or service characteristics of individual modes. Modal shares evolve over time in response to relative growth or contractions of commodities for which individual modes have advantages. For example, if the commodities in which rail intermodal has a large share grow more quickly than do other commodities, the total rail intermodal share will grow in the forecasts

Regional Definitions

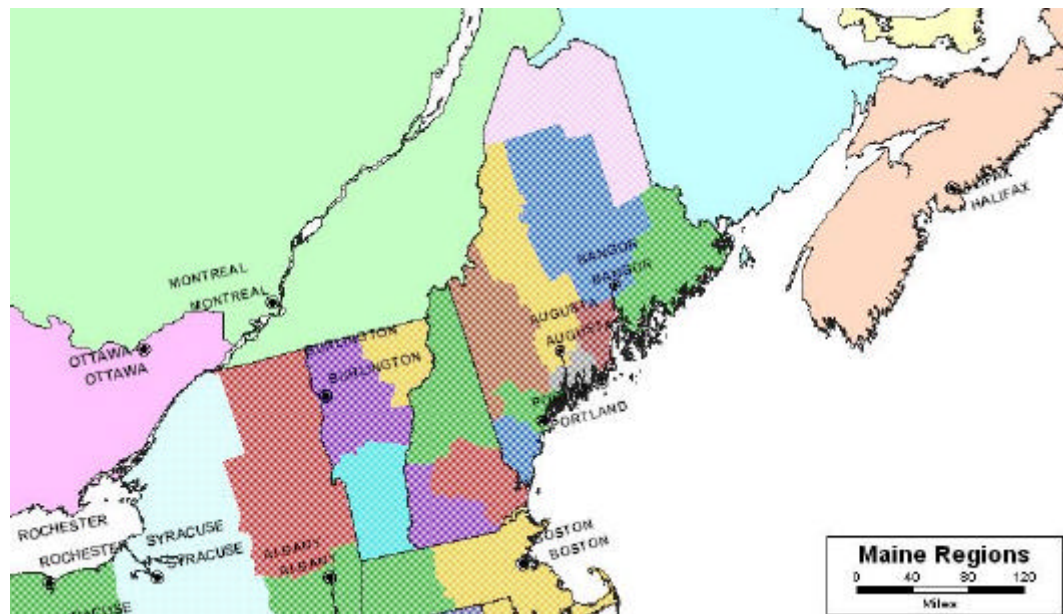
The movement of freight between Maine and the rest of the US and Canada depends on a complex set of economic and trade relationships between both rural bulk commodity production regions and manufacturing centers located in the Northeastern and Mid-Western US and Atlantic Canada. A significant amount of truck, rail and waterborne freight traffic also moves between Maine and other regions of the US and Canada, especially the Southeast and Mid-Atlantic states.

The objective behind designating trading regions in this study is to provide a basis for understanding the flow of commodities to and from Maine and to establish a quantitative basis for evaluating the effects of constructing a major East-West highway through the state.

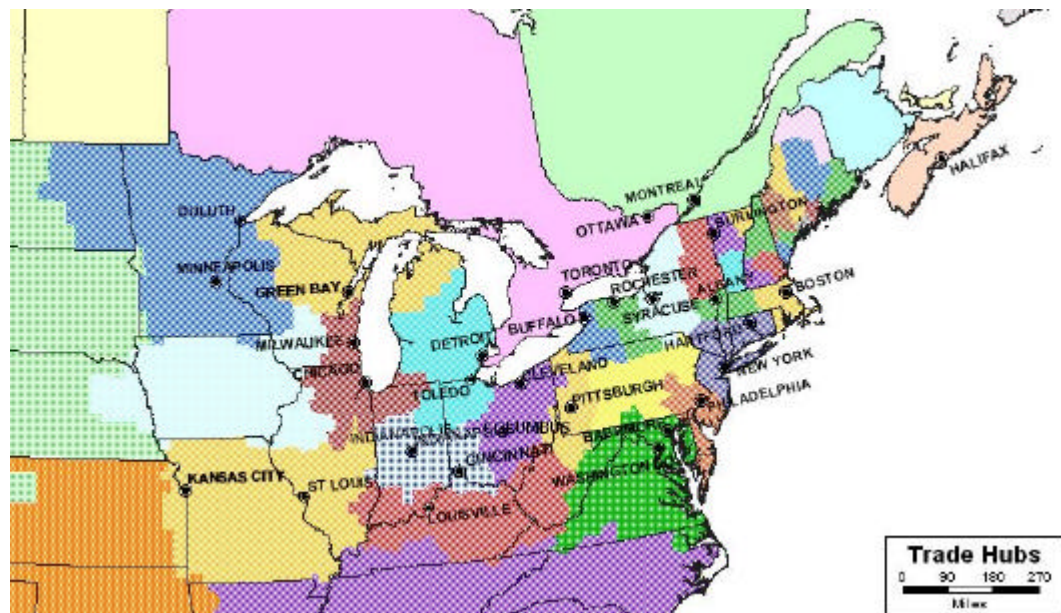
The three figures below show in progressively larger scale, the geographic detail used to develop estimates of current freight volume and forecasts of future commodity flow. Within the State of Maine, individual counties and aggregations of two to three of the

¹ MDOT Office of Freight Transportation, Integrated Freight Plan, May 1998, prepared by Cambridge Systematics, page 3-4.

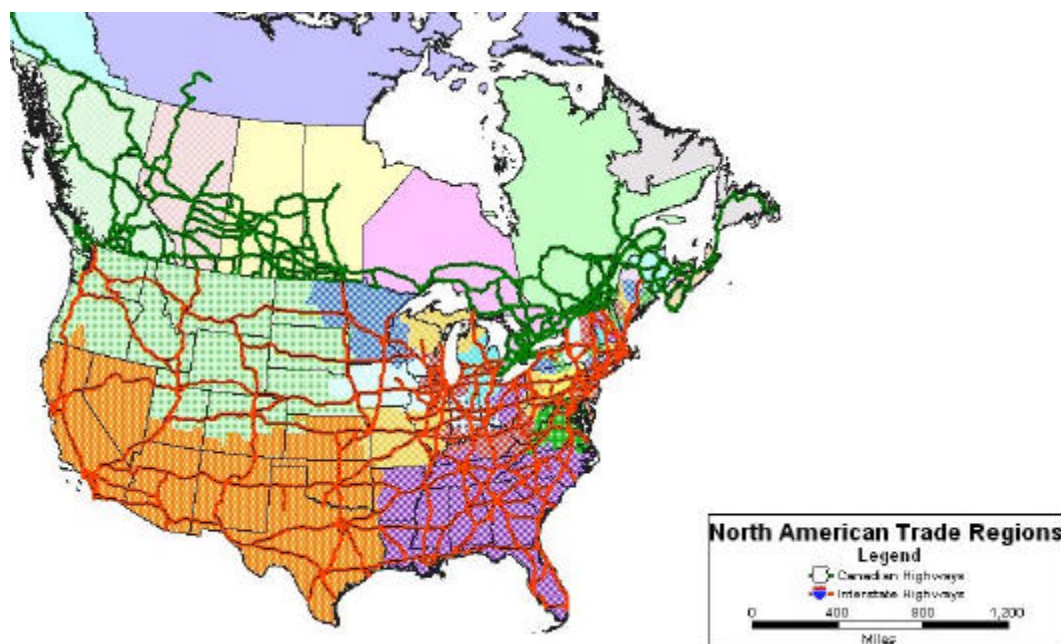
more sparsely populated counties were used to define a detailed set of regions (see Figure 4-1). These county-based regions correspond to the geography used in the economic policy simulations developed in other parts of the studies developed to analyze the effects of the proposed highway and alternatives on the economy of Maine. The configuration of primary roadways in New Hampshire, Vermont, Massachusetts and Eastern New York were used in conjunction with the location of major metropolitan hubs to establish groups of counties in those states that were economically linked to each other. These regions were generally smaller than economic regions designated by the Bureau of Economic Analysis (so-called BEA regions). They, too, are shown in Figure 4-1, as are some of the major metropolitan areas around which these multi-county regions are centered.

Figure 4-1**Maine Regions**

Special attention was focused on a number of significant trading regions in the US and Canada located outside of the immediate New England region. These areas, located primarily in central and western New York, the Great Lakes and mid-Atlantic regions, and Ohio River Valley consist of BEA regions or aggregations of these regions as defined by the Bureau of Economic Analysis in 1995. Figure 4-2 shows the configuration of these regions, and identifies several of the metropolitan areas that serve as hubs for commerce within them. Commodity flows between Maine and these regions, including the Provinces in central Canada are probably the most important to understand with regard to planning for a major East-West highway in the State of Maine. Estimates of current freight flow presented in the body of this section show how flows between Maine and these regions varies with respect to inbound and outbound flow as well as with respect to the kinds of commodities moved.

Figure 4-2**Trade Hubs**

Accounting for all of the freight flow to, from and through the State of Maine requires an examination of the remainder of the US and Western Canada. We have assumed, based on a preliminary analysis of the commodity flow estimates developed for this study, that the areas outside of those shown in Figure 4-2 can be characterized as multi-state regions roughly corresponding to the Southeastern, Southwestern and Northwestern US. Most of these large-scale regions are served by either north-south long-haul trucking, which would not involve significant East-West movements through Maine, or the movement of commodities by rail or water over distances not usually considered economically feasible for truck traffic. The breakdown of these remaining three regions and the configuration of all major highways that serve them and the other sub-state regions designated in the previous figures are shown in Figure 4-3.

Figure 4-3 North American Trade Regions

Overview

Maine

In 1997, 11.2 million tons of cargo left the state of Maine by rail, truck, or water. Tonnage leaving the state travels primarily by truck, which accounted for 95.2% of tonnage in 1997. Rail accounted for 3.8% while shipments by water accounted for only 1% of total outbound tonnage in 1997.²

Table 4-1 Maine Inbound-Outbound Tonnage Summary
1997

	Outbound		Inbound	
	Tons	Percent	Tons	Percent
Truck	10,674,541	95.2%	3,696,490	52.6%
Rail	430,882	3.8%	409,386	5.8%
Water	113,141	1.0%	2,916,968	41.5%
Total	11,218,564	100.0%	7,022,844	100.0%

Inbound tonnage totaled 7.0 million tons in 1997. Trucks are the most popular mode of transportation to move cargo into the state, with 52.6% of total tonnage entering the state by truck. Much more tonnage enters the state via water transport than leaves the state by the same mode; 41.5% of 1997 tonnage entered Maine by boat. Rail accounted for only 5.8% of tonnage entering the state in 1997.

² All tonnage estimates presented in the following tables exclude certain commodities moved by truck. Please refer to pages IV-2 and IV-3 for an explanation of data limitations.

Atlantic Canada

In 1997, 8.3 million tons of freight left Atlantic Canada, 54.1% by truck, and 45.9% by rail. Inbound freight is only slightly higher than outbound at 8.5 million tons in 1997. The tendency is slightly more toward rail freight, however, which accounts for 55% of total inbound tonnage.

Table 4-2 Atlantic Canada Inbound-Outbound Tonnage Summary
1997

	Outbound		Inbound	
	<i>Tons</i>	<i>Percent</i>	<i>Tons</i>	<i>Percent</i>
Truck	4,505,951	54.1%	3,841,426	45.0%
Rail	3,818,004	45.9%	4,688,521	55.0%
Total	8,323,955	100.0%	8,529,947	100.0%

Outbound - From Maine

By Commodity: US Destinations

The top three commodities (by tonnage) leaving Maine are paper, converted paper or paperboard products, and field crops. Together, these three commodities accounted for over half of all tonnage leaving the state, with paper alone accounting for 30% of outbound tonnage. The top three exports move primarily by truck, with small percentages of each moving by rail, and none by water.

After the top three commodities, 16 other commodities had over 100,000 tons exported in 1997. These 16 commodities account for an additional 33% of outbound tonnage, leaving the balance of outbound cargo widely dispersed among the remaining commodity categories.

Nine commodity groups shipped more than 100,000 tons to any single destination. The single largest commodity-destination pair was shipments of canned or preserved food to the Chicago region, with 554,494 tons shipped in 1997, all by truck.

Table 4-3 Outbound Maine Tonnage by Commodity and Mode
1997

	Truck	Rail	Water	Total
Paper	3,297,801	71,623	0	3,369,424
Converted Paper or Ppbd. Products	1,547,544	0	0	1,547,544
Field Crops	1,006,315	4,080	0	1,010,395
Top 3 Subtotal	5,851,660	75,703	0	5,927,363
% Total	54.8%	17.6%	0.0%	52.8%
Canned Food	989,031	0	0	989,031
Grain Mill Products	516,221	1,852	0	518,073
Household Appliances	280,095	1,089	0	281,184
Concrete, Gypsum, Plaster	244,225	0	0	244,225
Meat or Poultry, fresh or chilled	194,447	0	0	194,447
Misc. Textile Products	157,736	0	0	157,736
Beverages or Flavor Extracts	147,176	3,351	0	150,527
Paving or Roofing Materials	144,494	0	0	144,494
Ships or Boats	136,037	0	0	136,037
Leather Footwear	134,591	0	0	134,591
Waste or Scrap	0	37,788	94,574	132,362
Misc. Food Preparations	127,504	0	0	127,504
Bakery Products	124,236	0	0	124,236
Dairy Products	120,699	0	0	120,699
Industrial Chemicals	67,990	50,743	0	118,733
Containers or Boxes, Paper	101,326	0	0	101,326
Total (all commod. >100,000 tons)	9,337,468	170,526	94,574	9,602,568
% Total	87.5%	39.6%	83.6%	85.6%
Total	10,674,541	430,882	113,141	11,218,565

By Mode: US Destinations

The vast majority of cargo leaving Maine leaves by truck. Truck cargo accounts for 95% of outbound cargo, with rail and water accounting for only 4% and 1% respectively. The top three exports overall (paper, converted paper/paperboard products, and field crops) are the top commodities moved by truck. The top exports by rail in 1997 were paper (71.6 thousand tons), pulp or pulp mill products (62.6 thousand tons), and waste/scrap (37.8 thousand tons). Waste/scrap is the top commodity moved by water, with 94.6 thousand tons exported in 1997, over 83% of tonnage exported via water routes.

By US Destination

The Southeast US is the largest destination for cargo leaving the state of Maine. With 1.9 million tons of cargo leaving the state for Southeast US destinations, the region accounted for 17.3% of total tonnage exports in 1997. The Chicago and New York City/New Jersey areas are the second and third largest destinations for goods leaving the state with 1.4 million tons moving from Maine to each of the two areas. The Southwest, Washington D.C., and Boston follow the top 3 destinations closely, with each receiving between 790,000 (Boston) and 894,000 (Southwest) tons of cargo in 1997.

**Table 4-4 Outbound Maine Freight: By Mode and Destination
1997**

	Truck		Rail		Water		Total	
	Tons	% Truck	Tons	% Rail	Tons	% Water	Tons	% Total
SE USA	1,840,928	17.25%	95,949	22.27%	0	0.00%	1,936,877	17.26%
Chicago	1,320,531	12.37%	70,748	16.42%	0	0.00%	1,391,279	12.40%
NY/NJ	1,347,853	12.63%	25,786	5.98%	0	0.00%	1,373,639	12.24%
SW USA	854,523	8.01%	39,483	9.16%	0	0.00%	894,006	7.97%
Washington, DC	821,707	7.70%	8,712	2.02%	0	0.00%	830,419	7.40%
Boston	765,162	7.17%	24,583	5.71%	814	0.72%	790,559	7.05%
Philadelphia	321,205	3.01%	8,146	1.89%	87,194	77.07%	416,545	3.71%
Subtotal	7,271,909	68.12%	273,407	63.45%	88,008	77.79%	7,633,324	68.04%
Total	10,674,541	100.00%	430,882	100.00%	113,141	100.00%	11,218,564	100.00%

Outbound commodity-destination pairings are very concentrated. Despite the high volume of cargo that is sent to the Southeast USA, only a small number of commodities make up that volume. The same is true for all of the top destinations of Maine commodities.

Outbound Freight to Canada

**Table 4- 5 Truck Freight from Maine to Canada by Commodity
1997**

	Tons	% Total
Sawmill or Planing Mill Products	90,874	20.4%
Paper	81,627	18.3%
Waste or Scrap	75,417	16.9%
Primary Forest Products	72,994	16.4%
Subtotal (commod. >100,000 tons)	320,912	71.9%
Total	446,343	

Commodities shipped from Maine to all of Canada account for just 4% of all outbound truck traffic. Tonnage moving by truck from Maine to Canada is highly concentrated, with just over 70% of total truck tonnage accounted for by four commodities. The volumes moved by commodity type, while concentrated in a few groups, is still relatively small compared with shipments to other parts of the US by truck. After the top four commodities, the balance of the tonnage is widely dispersed among the remaining commodity groups.

Table 4- 6 Truck Freight from Maine to Canada by Destination
1997

	Tons	% Total
Quebec	227,055	50.9%
Ontario	76,291	17.1%
New Brunswick	72,556	16.3%
Nova Scotia	57,864	13.0%
Subtotal (origins >100,000 tons)	433,766	97.2%
Total	446,343	

Quebec alone accounts for over 50% of truck freight leaving Maine for Canadian destinations. No other destination comes close to the tonnage travelling from Maine to Quebec. Compared with US destinations, Quebec is relatively important, with a truck volume less than that of southbound shipments to the Philadelphia region and on the same order of magnitude as shipments to the Louisville and Cleveland regions in the US. The top four Canadian destinations account for nearly all of the freight leaving Maine for Canada.

Quebec is the only Canadian destination that receives more than 50,000 tons of a single commodity. Sawmill or planing mill products (79,412 tons) and primary forest products (69,072 tons) are the only two commodities shipped to any Canadian destination that account for more than 50,000 tons.

Inbound - To Maine

By Commodity: US Origins

Over 7.0 million tons of commodities were shipped to Maine in 1997. Products of petroleum refining account for 2.5 million tons or 35% of the total, and almost all of this arrives by water. After petroleum products, the top three imports in terms of tonnage are bituminous coal or lignite, concrete, gypsum, and plaster, and paving or roofing materials. All inbound commodities greater than 100,000 tons account for less than half of total tonnage imports into the state indicating that imports are much more evenly distributed among the commodity categories than exports.

Table 4-7 Inbound Maine Tonnage by Commodity and Mode
1997

	Truck	Rail	Water	Total
Products of Petroleum Refining	20,970	20,030	2,446,743	2,487,743
Bituminous Coal or Lignite	0	0	292,766	292,766
Concrete, Gypsum, Plaster	283,930	0	0	283,930
Top 3 Sub Total	304,900	20,030	2,739,509	3,064,439
% Total	8.2	4.9	93.9	43.6
Paving or Roofing Materials	161,110	0	112,396	273,506
Industrial Chemicals	184,484	48,492	0	232,976
Primary Forest Materials	201,565	5,552	0	207,117
Misc. Coal or Petroleum Products	126,326	0	43,937	170,263
Agricultural Chemicals	125,485	12,045	0	137,530
Motor Vehicles or Equipment	71,106	64,397	0	135,503
Misc. Chemical Products	108,538	10,485	0	119,023
Paper	106,910	10,905	0	117,815
Plastic Materials or Synthetic Fibers	101,331	11,589	0	112,920
Grain Mill Products	81,801	24,615	0	106,416
Fresh Vegetables	104,586	0	0	104,586
Total (all commod. >100,000 tons)	1,678,142	208,110	2,895,842	4,782,094
% Total	45.4%	50.8%	99.3%	68.1%
Total	3,696,490	409,386	2,916,968	7,022,845

By Mode: US Origins

While on the outbound side, truck shipments clearly dominated, inbound cargo is almost as likely to arrive by boat as it is by truck with 41.5% and 52.6% of tonnage imports respectively. This picture changes drastically when petroleum products are removed from the commodity mix. When petroleum products are subtracted from total imports, the share of cargo moved by truck increases to 81%.

Table 4-8 Inbound Maine Freight: Influence of Petroleum Products
1997

	Including Petroleum		Excluding Petroleum	
	Tons	Percent	Tons	Percent
Truck	3,696,490	52.6%	3,675,520	81.0%
Rail	409,386	5.8%	389,356	5.6%
Water	2,916,968	41.5%	470,225	10.4%
Total	7,022,845	100.0%	2,635,102	100.0%

Top commodities moved by rail include motor vehicles or equipment, miscellaneous food preparations, and industrial chemicals. By water, as mentioned, the top commodity is petroleum products, which account for 83.8% of total imports by water. Bituminous coal or lignite follows petroleum products, with 292,766 tons imported via water. The

main commodities shipped by truck include concrete, gypsum, or plaster (283,930 tons), primary forest materials (201,865 tons), and industrial chemicals (184,484 tons).

By US Origin

The inbound commodity mix is dominated by petroleum entering the state via water routes. The remainder of the inbound analysis will focus on inbound shipments net of petroleum products (STCC 291). This will present a more realistic picture of inbound freight.

The majority of the non-petroleum freight (80%) entering Maine from origins shipping more than 100,000 tons to the state in 1997 traveled by truck. Net of petroleum products, the Southeast USA is the largest origin of freight entering the state of Maine.

**Table 4-9 Inbound Maine Freight: By Mode and Origin
Net of Petroleum Products (STCC 291)
1997**

	Truck		Rail		Water		Total	
	Tons	% Truck	Tons	% Rail	Tons	% Water	Tons	% Total
Southeast USA	525,498	14.3%	65,847	16.9%	4,342	0.9%	595,687	13.1%
Boston	520,209	14.2%	17,970	4.6%	1,422	0.3%	539,601	11.9%
New York City / New Jersey	327,300	8.9%	27,930	7.2%	125,891	26.8%	481,121	10.6%
Southeastern New Hampshire	384,638	10.5%	0	0.0%	0	0.0%	384,638	8.5%
Southern New Hampshire	384,514	10.5%	0	0.0%	0	0.0%	384,514	8.5%
Washington DC	49,846	1.4%	10,604	2.7%	301,486	64.1%	361,936	8.0%
Southwest USA	201,600	5.5%	19,067	4.9%	15,802	3.4%	236,469	5.2%
Detroit	91,757	2.5%	83,934	21.6%	0	0.0%	175,691	3.9%
Cleveland	114,989	3.1%	6,999	1.8%	0	0.0%	121,988	2.7%
Northern New Hampshire	120,063	3.3%	0	0.0%	0	0.0%	120,063	2.6%
Philadelphia	89,459	2.4%	1,434	0.4%	20,368	4.3%	111,261	2.5%
Louisville	95,698	2.6%	11,666	3.0%	0	0.0%	107,364	2.4%
Total (all origins >100,000 tons)	2,905,571	79.1%	245,451	63.0%	469,311	99.8%	3,620,333	79.8%
Total	3,675,520		389,356		470,225		4,535,102	

Inbound freight commodity-origin pairings are very different from outbound. The commodity mix is much broader with a wider range of commodities entering the state from a larger number of origins.

Inbound Freight from Canada**Table 4- 10 Truck Freight from Canada to Maine by Commodity
1997**

	Tons	% Total
Sawmill or Planing Mill Products	473,483	25.0%
Misc. Wood Products	447,405	23.7%
Primary Forest Materials	217,037	11.5%
Waste or Scrap	161,014	8.5%
Motor Vehicles or Equipment	141,408	7.5%
Abrasives, Asbestos Products, etc.	141,393	7.5%
Subtotal (commod. >100,000 tons)	1,581,740	83.7%
Total	1,890,801	

The composition of Maine imports from the US and those from Canada are very different. While imports from US origins vary widely across commodities and origins, inbound freight from Canada is very focussed on a small number of both commodities and origins. In 1997, 1,890,801 tons of cargo entered Maine by truck from Canada. Of this tonnage, only six products account for almost 84% of the total inbound truck tonnage whereas 14 commodities accounted for only 68% of total (truck, rail, water) tonnage arriving from US origins.

Table 4- 11 Truck Freight from Canada to Maine by Origin

	Tons	% Total
New Brunswick	966,798	51.1%
Quebec	639,133	33.8%
Ontario	209,876	11.1%
Subtotal (origins >100,000 tons)	1,815,807	96.0%
Total	1,890,801	

As with the concentrated number of commodities shipped from Canada to Maine, there is also a high concentration in the number of origins within Canada that ship significant tonnage to the state. The top three origins account for nearly all of the truck freight shipped from Canada to Maine, with 1,815,807 tons shipped in 1997. Both Quebec and New Brunswick ship more volume of materials to Maine than the top three US originating regions. Eastbound truck volumes shipped from Quebec to Maine form a significant amount of all inbound volume – the 639,133 tons amounting to over 11% of all inbound volume from both the US and Canada.

**Table 4- 12 Truck Freight from Canada to Maine
by Origin by Commodity**

Origin	Commodity	Tons	% Total
Quebec	Primary Forest Materials	199,506	10.6%
	Sawmill or Planing Mill Products	131,270	6.9%
	Abrasives, Asbestos Products, etc.	104,759	5.5%
New Brunswick	Sawmill or Planing Mill Products	332,383	17.6%
	Misc. Wood Products	410,979	21.7%
	Waste or Scrap	126,869	6.7%
Ontario	Motor Vehicles or Equipment	139,134	7.4%
		1,444,900	76.4%

Outbound - From Atlantic Canada

By Commodity

In 1997, 8.3 million tons of freight left Atlantic Canada by either rail or truck. Sawmill and planing mill products accounted for 1.2 million tons of freight. The second and third most-shipped commodities are not classifiable as individual commodities; they are mixed loads and miscellaneous freight shipments. The next largest commodities shipped include paper, miscellaneous wood products, and miscellaneous food preparations. All commodities shipping greater than 100,000 tons of freight accounted for 82.3% of tonnage leaving Atlantic Canada in 1997.

**Table 4-13 Outbound Atlantic Canada Tonnage by Commodity and Mode
1997**

	Truck	Rail	Total
Sawmill & Planing Mill Products	886,662	274,969	1,161,631
Mixed Loads	0	996,086	996,086
Misc. Freight	163,627	758,262	921,889
Paper	363,734	540,683	904,417
Misc. Wood Products	598,793	286,479	885,272
Misc. Food Preparations	412,611	17,174	429,785
Fresh Vegetables	193,409	0	193,409
Misc. Forest Products	199,242	0	199,242
Lead or Zinc Ores	0	150,495	150,495
Misc. Nonmetallic Minerals	63,940	68,064	132,004
Canned or Preserved Food	209,579	249	209,828
Primary Forest Materials	34,557	77,822	112,379
Paper or Building Board	47,450	163,981	211,431
Industrial Chemicals	22,910	195,075	217,985
Tires or Inner Tubes	125,326	0	125,326
Subtotal (all commod. >100,000 tons)	3,321,840	3,529,339	6,851,179
% Total	73.7%	92.4%	82.3%
Total	4,505,951	3,818,004	8,323,955

By Mode

In 1997, 54.1% of outbound Atlantic Canada tonnage was shipped by truck. The top three commodities leaving Atlantic Canada by truck are sawmill or planing mill products, miscellaneous wood products, and miscellaneous food preparations. Together, these three commodities account for 42.1% of total outbound freight by truck.

Rail freight accounts for nearly half of all tonnage leaving Atlantic Canada at 3.8 tons in 1997. The top rail commodities include mixed loads, miscellaneous freight shipments, paper, sawmill and planing mill products, and miscellaneous wood products. After mixed loads (996,086 tons) and miscellaneous shipments (758,262), paper had the highest tonnage at 540,683 tons in 1997. These three groups accounted for 60% of outbound rail tonnage in 1997.

By Destination

Quebec, Ontario, and Maine are the three largest destinations, by a large margin, for freight leaving Atlantic Canada by either truck or rail, accounting for 61.7% of tonnage leaving Atlantic Canada. In terms of freight traveling by truck, Quebec is the largest destination for freight leaving Atlantic Canada with just over one million tons in 1997. The province is followed closely by Maine, also with just over one million tons of truck freight from Atlantic Canada. After these two destinations, Ontario and the US South are the biggest destinations for Atlantic Canada truck freight. The top three destinations account for 65.1% of truck tonnage leaving the region. The remaining US regions (South and North) account for very little truck freight.

Table 4-14 Outbound Atlantic Canada Freight by Mode and Destination

	Truck	Rail	
Ontario	863,730		2,002,425
Quebec		1,060,717	2,108,653
	2,085,672	654,939	
Maine	1,023,345		
	322,507		
New York			
Pennsylvania	200,616		
	169,942		
Southern US		320,004	649,343
	146,207	491,877	
Subtotal (destinations >100,000 tons)	4,472,884		8,139,116
% Total		96.0%	97.8%
	4,505,951	3,818,004	

Rail freight travels primarily to Ontario, Quebec, and the US Northeast (state-level rail data is not available the next part of this study). Freight under 75% of freight tonnage leaving Atlantic Canada by rail. The remaining US regions (South and North) for other Canadian provinces.

Table 4-15 Distribution of Outbound Tonnage by Destination

	Truck	Rail	Total
Ontario	19.2%	29.8%	24.1%
Quebec	23.3%	27.8%	25.3%
Northeast US	46.3%	17.2%	32.9%
Maine	22.7%		
Southern US	7.3%	8.4%	7.8%
Northern US	3.2%	12.9%	7.7%

Table 4-16 Outbound Commodity-Destination Pairings

Destination	Commodity	Truck		Rail		Total
		Tons	%	Tons	%	Tons
Quebec	Lead or Zinc Ores	0	0.0%	150,495	100.0%	150,495
	Misc. Food Preparations	118,032	93.1%	8,790	6.9%	126,822
	Sawmill or Planing Mill Products	198,195	93.2%	14,370	6.8%	212,565
	Misc. Wood Products	57,609	54.2%	48,663	45.8%	106,272
	Paper	67,687	58.8%	47,416	41.2%	115,103
Ontario	Misc. Food Preparations	113,552	96.7%	3,874	3.3%	117,426
	Sawmill or Planing Mill Products	110,073	63.6%	62,949	36.4%	173,022
	Paper	9,995	9.6%	93,903	90.4%	103,898
Maine	Sawmill or Planing Mill Products	338,621	100.0%		0.0%	338,621
	Misc. Wood Products	424,763	100.0%		0.0%	424,763
Southern US	Sawmill or Planing Mill Products	38,262	26.5%	106,249	73.5%	144,511
	Paper	36,686	26.3%	102,600	73.7%	139,286
Northeast US	Misc. Wood Products			146,890	100.0%	146,890
	Paper			214,020	100.0%	214,020

Inbound - To Atlantic Canada

By Commodity

Mixed loads and miscellaneous freight shipments, which account for 31.7% of total inbound tonnage—the majority of that freight entering the region by rail—dominate inbound freight. Miscellaneous food preparations, products of petroleum refining, industrial chemicals, and sawmill or planing mill products follow mixed and miscellaneous shipments, adding another 1.9 million tons of inbound cargo. Those commodities with greater than 100,000 tons shipped to Atlantic Canada in 1997 account for a total of 6.9 million tons of freight, or 81% of total inbound tonnage.

Table 4- 17 Inbound Atlantic Canada Tonnage by Commodity and Mode
1997

	Truck	Rail	Total
Mixed Loads	0	1,435,304	1,435,304
Misc. Freight Shipments	512,087	760,819	1,272,906
Misc. Food Preparations	421,229	142,352	563,581
Products of Petroleum Refining	162,522	373,511	536,033
Industrial Chemicals	74,249	371,763	446,012
Sawmill or Planing Mill Products	291,051	24,386	315,437
Paper	185,457	101,734	287,191
Misc. Wood Products	11,596	237,588	249,184
Fabricated Structural Metal Products	182,603	39,983	222,586
Field Crops	13,389	173,400	186,789
Paper or Building Board	91,885	86,712	178,597
Waste or Scrap	134,734	43,494	178,228
Abrasives, Asbestos Products, Etc.	142,665	0	142,665
Portland Cement	0	129,221	129,221
Clay, Ceramic, or Refrac. Minerals	1,186	117,270	118,456
Motor Vehicles or Equipment	51,072	62,501	113,573
Misc. Coal or Petroleum Products	23,608	88,756	112,364
Fresh Vegetables	111,606	0	111,606
Misc. Transportation Equipment	3,566	102,707	106,273
Canned or Preserved Food	99,942	2,653	102,595
Meat or Poultry, Fresh or Chilled	102,340	0	102,340
Subtotal	2,616,787	4,294,154	6,910,941
% Total	68.1%	91.6%	81.0%
Total	3,841,426	4,688,521	8,529,947

By Mode

Inbound tonnage is dominated by rail which accounts for 55% of total cargo destined for Atlantic Canada. Inbound truck freight amounted to 3.8 million tons in 1997, or 45% total inbound tonnage. Miscellaneous freight shipments, miscellaneous food preparations, and sawmill or planing mill products dominate inbound truck freight. The top three commodities in terms of tonnage accounted for 31.9% of total inbound truck cargo in 1997. Inbound rail freight is dominated by miscellaneous freight shipments, products of petroleum refining, and industrial chemicals, with the top three commodities accounting for 46.5% of total inbound rail tonnage.

By Origin

Quebec and Ontario are by far the largest origins of Atlantic Canada imports, accounting for 82% of inbound truck freight, and 75.5% of inbound rail freight. Each of these regions ships over three million tons of freight to Atlantic Canada. The next largest origin in terms of tonnage is the US South which shipped 484,416 thousand tons of cargo to Atlantic Canada in 1997. Most of this freight arrived by rail, with only 36% arriving by truck.

**Table 4- 18 Inbound Atlantic Canada Freight by Mode and Origin
1997**

	Truck		Rail		Total
	Tons	%	Tons	%	Tons
Quebec	1,381,795	36.0%	1,617,724	34.5%	2,999,519
Ontario	143,123	3.7%	1,923,492	41.0%	2,066,615
Saskatchewan	1,785,655	46.5%	116,741	2.5%	1,902,396
US South	175,931	4.6%	308,485	6.6%	484,416
US Northeast	350,544	9.1%	113,774	2.4%	464,318
Maine	142,132	3.7%	N/A	0.0%	
US North	94,458	2.5%	277,651	5.9%	372,109

Table 4- 19 Inbound Commodity—Origin Pairings

Origin	Commodity	Truck		Rail	
		Tons	%	Tons	%
US South	Clay, Ceramic, or Refrac. Materials	1152	1.1%	100588	98.9%
Ontario	Misc. Food Preparations	261630	78.9%	70033	21.1%
	Industrial Chemicals	22820	14.1%	139011	85.9%
	Misc. Coal or Petroleum Products	9397	3.1%	290040	96.9%
	Fabricated Structural Metal Products	63935	62.4%	38543	37.6%
	Misc. Freight Shipments	214644	52.7%	192850	47.3%
	Mixed Loads	0	0.0%	633505	100.0%
Quebec	Misc. Food Preparations	140595	80.2%	34763	19.8%
	Sawmill or Plane Mill Products	264201	97.0%	8118	3.0%
	Misc. Wood Products	5388	4.3%	120553	95.7%
	Paper	103386	57.0%	78139	43.0%
	Industrial Chemicals	42442	20.1%	168421	79.9%
	Misc. Coal or Petroleum Products	146412	94.2%	8956	5.8%
	Portland Cement	0	0.0%	127863	100.0%
	Misc. Freight Shipments	231917	46.4%	267736	53.6%
	Mixed Loads	0	0.0%	603859	100.0%

Conclusion

The following summary conclusions are drawn from the analysis of 1997 commodity flows in Maine and Atlantic Canada:

Mode of Transportation

Trucks are by far the dominant mode of commodity transport in Maine. In 1997, trucks carried 95.2% of Maine's total outbound tonnage and 52.6% of the state's inbound tonnage. The lower percentage of inbound tonnage carried by truck is due to the fact that Maine imports large volumes of petroleum products by water. When this influence is removed, trucks also carry the vast majority of remaining inbound commodities to Maine.

Only a small percentage of total tonnage transported into and out of Maine is carried by rail. Rail accounted for only 3.8% of outbound and 5.8% of inbound tonnage in 1997. However, over-land freight movements into and out the Atlantic Provinces are more

likely to be carried by rail. For out-bound shipments, 54.1% were transported by truck, and 45.9% by rail. Totals for inbound freight were essentially reversed, with 55% carried by rail and 45% by truck.

Because the flow of east-west commodity traffic through the Atlantic Provinces is heavily influenced by rail, the overall volume of commodities currently moved by truck, into and out of the Atlantic Provinces combined, is less than the State of Maine. In 1997, the total weight of over-land freight moved into and out of the Atlantic Provinces, combined, was 16.8 million tons, slightly higher than the 15.2 million tons shipped into and out of Maine. However, total tonnage carried by truck was only 8.3 million tons, much lower than Maine's volume of 14.3 million tons. The data suggest that overall volumes of truck freight available for diversion to an east-west highway may be more limited than first thought. Similarly, the diversion of some portion of rail shipments through the Atlantic Provinces may be a more important source of user demand for the proposed highway.

Outbound Flows

Maine's top three exported products overall (paper, converted paper/paperboard products, and field crops) are also the top commodities moved by truck. Of a total of 9.3 million tons of outbound freight carried by truck, nearly 55% consisted of these three commodity groups.

The Southeast US is the largest destination for cargo leaving the state of Maine, receiving 1.9 million tons of cargo in 1977. The Southeast accounted for 17.3% of the total tonnage exported from Maine to other US destinations in 1997. The Chicago and New York City/New Jersey areas are the second and third largest destinations for goods leaving the state. The Southwest, Washington D.C., and Boston follow the top 3 destinations closely. The significant volumes of goods transported to the Chicago area suggest a potential source of demand for an improved westward highway connection through Maine.

Commodities shipped to all of Canada account for just 4% of total outbound truck freight from Maine. Tonnage moving by truck from Maine to Canada is highly concentrated, with just over 70% of total truck tonnage accounted for by four commodities; sawmill or planing mill products, paper, waste or scrap and primary forest products. Together these four groups accounted for nearly 72% of the 446,000 tons of outbound truck freight shipped from Maine to all of Canada. Nearly 51% of Maine's outbound Canadian shipments were delivered to Quebec and nearly 70 percent of total Canada-bound tonnage was shipped to points to the west of the state.

Products exported from Atlantic Canada by truck are somewhat comparable to Maine, with a high composition of sawmill, wood, forest products and foodstuffs. These several commodity groups account for more than 2.9 million or 65% of the total outbound truck freight from the region. Approximately 1.9 million tons of this outbound truck freight was destined for Ontario and Quebec, roughly double the tonnage shipped to Maine. An additional 1.2 million tons of truck freight were likely to have been carried through Maine to destinations in Southern New England, the Mid-Atlantic and Southeastern U.S. Comparatively low volumes of truck freight appear to be shipped from the Atlantic Provinces to points west of Ontario, to either Canadian or US destinations.

Inbound Flows

The largest commodity groups (by weight) that are shipped into Maine by truck from the US, tend to fall under the categories of building and paving materials (445,000 tons), agricultural and industrial chemical products (310,000 tons), paper and forest products

(301,000 tons) and a variety of food products and consumer goods, including automobiles. From the US, the majority of product is shipped from Southern New England, the Middle Atlantic and Southeastern US States (about 2.3 million tons). Roughly 327,000 tons arrive from US locations to the west of Maine, such as Detroit and Cleveland), which may represent potential users of an east-west highway.

Of the nearly 1.9 million tons of Canadian freight shipped into Maine by truck, more than 60% consisted of sawmill, wood products or primary forest materials. Maine's also received a significant volume of motor vehicles and equipment (141,000 tons) from Canadian points of origin. Nearly 52% of the total tonnage was received from New Brunswick and another 34% from Quebec. Ontario also accounted for 11% of the total inbound product, or slightly less than 210,000 tons.

Of the 3.8 million tons of inbound truck freight to Atlantic Canada, roughly 1.5 million tons (40%) were shipped from Quebec and Ontario. An additional large volume of truck shipments (1.7 million tons) was also received from the province of Saskatchewan. By contrast, truck shipments into the Atlantic Provinces from the US were limited, with Maine accounting for less than 4% of the total.

V

Appendices

Appendices will be posted when available.